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**HYPERSONIC RESEARCH ENGINE/AEROTHERMODYNAMIC  
INTEGRATION MODEL - EXPERIMENTAL RESULTS  
Volume I - Mach 6 Component Integration**

**by**

**Earl H. Andrews, Jr. and Ernest A. Mackley**

**Langley Research Center**

**and**

**Engineering Staff, AiResearch Manufacturing Company**

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16. Abstract  The NASA Hypersonic Research Engine (HRE) Project was initiated in 1967 for the purpose of advancing the technology of airbreathing propulsion for hypersonic flight. A large component (inlet, combustor, and nozzle) and structures development program was encompassed by the project. The component development program was culminated in 1974 with the tests of a full-scale (18 in. diameter cowl and 87 in. long) HRE concept, designated the Aerothermodynamic Integration Model (AIM), in the NASA Lewis Research Center, Plum Brook Station Hypersonic Tunnel Facility at Mach numbers of 5, 6, and 7. AIM tests descriptions, data results, and analysis results have been previously documented. Four reports document computer program analysis results of the AIM experimental engine performance. Enough information is included in the four reports to enable additional analysis and/or additional or different interpretation of the AIM data. The present report (Volume I) presents computer program results for Mach 6 component integration tests. Program results are contained in three additional volumes that have the following subtitles:  Volume II - Mach 6 Performance Volume III - Mach 7 Component Integration and Performance Volume IV - Mach 5 Component Integration and Performance					
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HYPERSONIC RESEARCH ENGINE/AEROTHERMODYNAMIC  
INTEGRATION MODEL - EXPERIMENTAL RESULTS

Volume I - Mach 6 Component Integration

Earl H. Andrews, Jr. and Ernest A. Mackley

Langley Research Center

and

Engineering Staff, AiResearch Manufacturing Company

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SUMMARY

An extensive aerothermodynamic development program for the purpose of advancing the technology of airbreathing propulsion for hypersonic flight has been conducted by NASA in the form of the Hypersonic Research Engine (HRE) Project. The engine components (inlet, combustor, and nozzle) aerothermodynamic development program culminated in the testing of an engine which integrated these components and allowed assessment of engine performance at Mach numbers of 5, 6, and 7. This engine was termed the Aerothermodynamic Integration Model (AIM) and was a water-cooled, hydrogen-fueled, full-scale configuration of the HRE design concept, 18 inches in diameter at the cowl lip and 87 inches long.

Descriptions of the AIM tests and a computer program used in the engine performance analyses, as well as data results and analyses, have been previously documented. All of the results of the engine performance computer program, including enough information to enable additional analysis or interpretation of the data, are reported in four volumes. Volume I (present report) presents Mach 6 component integration results that were obtained with supersonic combustion. During the integration tests, inlet unstart limits were determined for fuel injection from the first stage fuel injectors only and for multi-stage fuel injection. Optimization of the fuel injector combination that would yield the best combustion and engine performance was attempted. Volume II presents Mach 6 engine performance results during supersonic and subsonic combustion modes. Combustion mode transition was successfully performed, exit surveys made, and effects of altitude, angle of attack, and inlet spike position were determined during these tests. Volume III presents Mach 7 component integration and engine performance results with supersonic combustion modes. Fuel injector optimization was again attempted, exit surveys made, and the effects of low free-stream total temperature, free-stream oxygen content, and angle of attack were studied during these tests. Volume IV presents Mach 5 component integration and engine performance results with supersonic and subsonic

combustion modes. Combustion mode transition was successfully demonstrated, exit surveys made, and effects of free-stream total temperature, free-stream oxygen content, and angle of attack were investigated during these tests.

## INTRODUCTION

The NASA Hypersonic Research Engine (HRE) Project was undertaken to design, develop, and construct a hypersonic research ramjet engine for high performance and to flight test the developed concept on the X-15-2A airplane over the speed range from Mach 3 to 8. It should be emphasized that from the beginning the design was specified to be a research ramjet engine to conduct meaningful experiments and was in no sense intended to be a small-scale prototype of a propulsion system for any particular mission.

About one year after the development phase of the HRE program was underway, the X-15 program was phased out; as a result, adjustments to the project plan and scope were necessitated, which were, however, effected without detriment to achievement of the basic project objectives. The result of the adjustment was that ground testing became the major experimental effort for the HRE program. Engine aerothermodynamic components (inlet, combustor, and nozzle) were developed in separate ground-test programs. Results of the development tests are documented in references 1 through 3. Regeneratively cooled engine structures were also included in the ground-testing program. Tests of the hydrogen-cooled engine structure progressed from small panels and problem area components in laboratory setups to wind-tunnel tests at Mach 6.7 of a full-scale, flight-weight engine termed the Structure Assembly Model (SAM). Results of this program, which was completed in May 1971, are reported in reference 4. Culmination of all the HRE development testing was the engine tests of what was termed the Aerothermodynamic Integration Model (AIM). The purpose of the tests of this full-scale, water-cooled, hydrogen-fueled engine was to integrate the aerothermodynamic components and to assess the engine performance at Mach numbers of 5, 6, and 7. Successful tests of the AIM were completed in April 1974.

The AIM employed the HRE design concept of an axisymmetric engine, 18 inches in diameter at the cowl lip and 87 inches long. Versatility was incorporated into the AIM to allow: (1) inlet spike translation for optimum air flow and inlet internal contraction ratio variation; and (2) hydrogen fuel injection for tailored fuel distribution for proper heat release in a diverging combustor, and to change the mode of combustion from supersonic to subsonic or vice versa. The AIM tests are reported in reference 5 and data results of the tests have been analyzed in terms of engine performance by use of a computer program (ref. 6) generated during the HRE program. Results of these analyses are reported in references 7 through 9.

The purpose of the present reports (herein and refs. 10 to 12) is to present experimental engine performance results obtained from computer program analyses of the test data. These results contain the free-stream conditions, pressure distributions, fuel injection configuration and rate, etc., that should enable additional analysis or interpretation of results other than those previously reported. It



should be noted that all units are in U.S. Customary Units because the data results from the HRE contracts, which were initiated in May 1965 with a follow-on effort in February 1967, were under that system. Because of the cost that would have been incurred if the contractors had been required to change to the metric system, the U.S. Customary Units were retained through the HRE contractual effort; this procedure is consistent with the guidelines for conversion established by NASA.

## SYMBOLS

All units are in U.S. Customary Units because of the reason noted above.

A	area, ft. <sup>2</sup>
M	Mach number
P or p	pressure, psia
r	radius, in.
R <sub>CL</sub>	cowl lip radius at 12° tangent point (see table 3), in.
x	longitudinal distance from inlet spike virtual tip (see table 3), in.
x <sub>CL</sub>	longitudinal distance from inlet spike virtual tip to the cowl lip 12° tangent point (see table 3), in.
Δx	longitudinal distance inlet centerbody moved from inlet physical close-off, in.
ΔΔx	difference between an actual x <sub>CL</sub> value and the Mach 6 x <sub>CL</sub> value of 34.884 in., in.
T	temperature, °R
α	angle of attack, deg.
φ	fuel equivalence ratio; value of unity is for stoichiometric combustion (subscript symbols or notations, such as φ <sub>1A</sub> or ERIA, represent the values for the designated fuel injector (e.g., 1A), EROA is the sum of all φ-values).

### Subscripts:

0	free stream
ref.	reference condition
th	throat
T	total

## APPARATUS

### Experimental Tests

Experimental tests of the HRE/AIM were conducted in the Plum Brook Hypersonic Tunnel Facility (HTF) (figs. 1(a) and 1(b)) at nominal Mach numbers of 5, 6, and 7. The AIM is shown partially installed in the HTF in the photographs of figures 1(c) and 1(d). During the tests the engine was nearly completely enshrouded except for an 11-inch gap between the facility nozzle exit and the front of the shroud as depicted in the schematic of figure 1(e). This test configuration was suggested by results of a subscale tunnel starting investigation reported in reference 13.

A description of the facility and the results of calibration tests are presented in reference 14. The test facility used an induction-heated, drilled-core graphite storage bed to raise the temperature of nitrogen to a nominal  $4960^{\circ}\text{R}$  at a maximum design pressure of 1200 psia. The nitrogen was mixed with ambient-temperature oxygen to produce synthetic air. Diluent nitrogen was added with the oxygen in the mixture at tunnel Mach numbers below 7 to control free-stream total temperature and to supply the correct weight flow. Because of facility heater deterioration and a lack of time to implement necessary repairs, true temperature simulation of  $3700^{\circ}\text{R}$  at Mach 7 was not achieved; a maximum temperature of about  $3100^{\circ}\text{R}$  was obtained.

The original test plan is summarized in table 1. Because of testing problems and limitations in facility schedule, the test plan was altered to provide a maximum of data to meet the test objectives. Details of the AIM tests are described in reference 5. General test conditions, results, and remarks of the AIM tests were tabulated in references 5 and 9 and are presented herein as table 2. All tests (reading numbers in second column) are listed including the tests that were aborted because of tunnel starting or other problems. Run numbers were assigned to AIM reading numbers or groups of AIM reading numbers with the same test objective (some readings represent zero success, partial success, or are reruns of others) to provide a means for a cross-check with the original plan.

### Model

The HRE/AIM was a full-scale (18 inches in diameter at the cowl and 87 inches long), water-cooled, hydrogen-fueled research engine. Details of the design and fabrication of the AIM have been reported in references 16 through 29. The design is described generally in references 5 and 9, and some difficulties encountered with the AIM during the tests are discussed in reference 5.

A schematic of the AIM is presented in figure 2 and the coordinates are listed in table 3. The AIM incorporated a mixed compression inlet with a translating spike that enabled the close-off of the engine (an early HRE program

requirement). The inlet was designed for spike translation to the most open position for Mach 4 to 6 operation with spillage occurring up to Mach 6. At Mach 6 "shock-on-lip" occurred, and from Mach 6 to 8 the spike was designed to translate to maintain shock-on-lip over this Mach number range. An "upsloping throat" was incorporated in the inlet which enabled the inlet to not only maintain shock-on-lip with spike translation for Mach 6 to 8, but also to have increased inlet contraction ratio with increased Mach number. The combustor was designed with diverging walls and the area distribution is shown in figure 3(a) with fuel injector locations indicated. Figure 3(b) presents a sketch of the combustor with the locations of the staged fuel injectors and two sets of ignitors indicated (a third set of ignitors planned for the outerbody at an x-station of 54.38 inches was not installed). The set of ignitors at an x-station of 42.0 inches malfunctioned and use was discontinued (see fig. 3(b)) about midway in the Mach 6 test program (see discussion in ref. 5). Injectors 1A, 1B, 1C, 4, 2A, and 2C were designed to allow optimum distribution of the fuel in the combustor to obtain a fuel equivalence ratio,  $\phi$ , of unity during the supersonic combustion mode. During the supersonic combustion mode, it was desired to inject the maximum amount of fuel from the first-stage injectors (1A and 1B) without unstating the inlet; all of the fuel was designed to be injected from injectors 1A and 1B at Mach 8. Injectors 3A and 3B were designed for use in the subsonic combustion mode. The locations are tabulated in figure 3(b) for the designed Mach 6 inlet operating position; cowl lip positions other than the Mach 6 position (because of spike translation) result in different x-station values for the injectors and ignitors on the outer wall and also for injector 3B. These changes are accounted for in the performance results presented herein.

### Instrumentation

Planned instrumentation for the AIM is documented in reference 15. All of the instrumentation planned was not used because of facility instrumentation recording channel limitations or damages to instrumentation in inaccessible places during the AIM final assembly or during AIM repairs at the test site. A list of all planned instrumentation is presented in table 4 (obtained from ref. 5) with notations indicating the items not installed or damaged, the recording channel numbers for each item used, and the ranges of the pressure transducers or thermocouples.

### Method of Calculation

A computer program that incorporated methods described in reference 15 was used in reducing the data from the AIM tests to engineering units. Listings of this program were checked for accuracy and determination of steady-state conditions. Times of interest were selected from each run and the information from the engineering units computer program was used in a performance analysis computer program which incorporated methods described in reference 6. After the erroneous surface pressures were eliminated, the remaining pressures at each station were averaged by the performance computer program which then performed surface-pressure integration by linear interpolation and determined the skin-friction coefficients. Chemical equilibria of the synthetic air and fuel-air mixtures were calculated by the program using methods described in reference 30.

## Description of Performance Program Methods

General.— Several methods were used to establish validity of critical parameters, such as the wind tunnel Mach number. The first method used curves generated from instrumentation rakes installed during calibration of the wind tunnel. The second method used measured values of wind tunnel total pressure and temperature, and pitot pressure at the spike tip along with real-gas, normal-shock solution to calculate the wind tunnel Mach number. The third method used measured values of wind tunnel total temperature, spike-tip pitot pressure, and spike cone surface pressure, along with the real-gas, normal-and conical-shock solutions, to calculate the wind tunnel Mach number. Calculations made utilizing each of the three methods indicated good agreement. After confidence was established in the three methods, the use of the third method was discontinued, since it required excessive computer time. Additional information concerning tunnel Mach number determination is contained in reference 9.

The conditions at the inlet throat were determined by computing the momentum and total enthalpy from the pressure forces and accounting for friction and heat losses incurred on the inlet spike and the internal surfaces. The inlet mass flow ratio and additive drag were determined from theoretical calculations (ref. 31). Pressures used in these calculations were obtained as follows: (1) for conditions where inlet start was obtained ( $M_{th} > 1$ ), the calculated mass-momentum-average static pressure was used, and the measured static pressures at the throat were not used; and (2) for conditions where inlet unstart was experienced ( $M_{th} \leq 1$ ), the average of the measured static pressures at the throat was used with the Mach number constrained to unity to calculate spillage and additive drag.

For both cases above, the flow was analytically expanded (isentropically) from the inlet throat conditions to the freestream static pressure in order to determine the hypothetical static enthalpy and associated velocity which are required to compute the inlet kinetic energy efficiency and the inlet process efficiency (as required under the contract statement of work). Also the flow was analytically compressed (isentropically) from the inlet throat conditions until the calculated total enthalpy matched the known total enthalpy after heat loss. For a started inlet, a side calculation was made by isentropically expanding the flow to an area which was arbitrarily set 10 percent larger than the throat area (for flow stability). At this point, the flow was passed through a normal shock. The limiting subsonic pressure recovery for the inlet and the corresponding kinetic energy and process efficiencies were then determined from conditions downstream of the normal shock. These inlet performance parameters were considered of interest as indicators of the overall inlet performance and of flow conditions prior to inlet unstart.

Two methods were used to calculate conditions at the combustor stations: (1) up to the first station where fuel was injected, the mass-momentum-averaged static pressure that satisfied the state, continuity, momentum, and energy equations was calculated; and (2) at stations downstream of the first fuel injector the average of the measured innerbody and outerbody pressures was used, and the combustor efficiency was calculated to satisfy the conservation equations. For these methods it was assumed that the flow area equals the geometric duct

area (no flow separation). The amount of hydrogen required to react in order to satisfy the measured static pressure, the duct area, the heat loss, and the conservation equations is computed by the program. Of the total hydrogen injected or present in the flow at a given station, the amount which reacts has been named "real" hydrogen and is used in the equilibrium chemistry process being completed. The hydrogen which is not reacting has been named "inert" hydrogen. The concept of real and inert hydrogen and the station-wise conversion from inert to real is simply a bookkeeping procedure in the program which simulates or "models" the mixing process. The inert hydrogen is assumed to have the properties of an inert gas, not to react with other species, and not to dissociate.

The combustor throat was defined as the point of minimum-flow area between the struts in the subsonic combustion mode and at the strut exit plane in the supersonic combustion mode. When the computed one-dimensional Mach number at the assumed combustor exit was found to be less than 0.95, the computation was considered to improperly represent the subsonic combustor flow situation in that the flow must have reached a sonic point further downstream. With the area increasing added combustion (heat release) downstream of the assumed combustor exit station is implied. Therefore, a side calculation was made of the combustor efficiency required to produce sonic velocity at the assumed combustor exit station, as if this added heat release occurred prior to the assumed combustor exit station. For this condition, the performance program printout shows results under the heading SONIC THROAT (e.g., reading 94, time 150.342 sec).

The regeneratively cooled combustor performance ("COMBUSTOR REGEN" in the performance program printout) was simulated by recalculating the total enthalpy at the combustor exit as the sum of the free-stream enthalpy of the synthetic air, the enthalpy of the hydrogen fuel at 50°R, and the absolute value of the heat loss through all the engine surfaces wetted by the internal flow stream. Using this total enthalpy, the stream total pressure, and the same combustion efficiency, the combustor exit static-state properties were also computed.

Nozzle performance was obtained by isentropically expanding the flow from the actual and regeneratively cooled combustor exits to the nozzle exit area and to ambient pressure ("NOZZLE AE" and "NOZZLE PO" in the performance program printout). The flow was then isentropically expanded from the actual combustor throat to those nozzle stations representing the locations of pressure taps, and the local skin-friction coefficients were calculated using the Spalding-Chi correlation. The nozzle vacuum stream thrust coefficient was also computed. This coefficient is arbitrarily defined in previous HRE documents (e.g., refs. 3 and 15) as the ratio of the actual nozzle exit total momentum (stream thrust) divided by the theoretical nozzle exit total momentum where the flow was isentropically expanded from the combustor exit conditions to the nozzle exit area (512.389 in<sup>2</sup>). The actual nozzle exit total momentum was determined by taking the combustor exit total momentum and adding (or subtracting) the pressure force, the friction force, and one-half of the calculated drag force (one-half of strut assumed to be charged to the nozzle component). The hypothetical static enthalpy resulting from the computed isentropic expansion from the combustor exit conditions to the free-stream static pressure was used to calculate the nozzle kinetic energy and process efficiencies.

Side calculations were made of a fictitious stagnation combustion process (constant pressure and zero velocity) with 100 percent combustion efficiency and no loss to the walls (denoted in the performance program printout as "FICTIVE COMBUSTOR"), followed by an isentropic expansion to ambient pressure to obtain the combustor effectiveness. Also to obtain the combustor effectiveness, the flow at the combustor exit was expanded to free-stream static pressure and the total momentum at this pressure was determined. The combustor effectiveness (ref. 15) is then the change in total momentum for the actual combustor process from the combustor entrance condition to the expanded (free-stream static pressure) condition divided by the change in total momentum for the fictitious process mentioned above from the combustor entrance condition to the expanded (free-stream static pressure) condition. Side calculations were also made of a fictitious nozzle to determine the static and total conditions ("FICTIVE NOZZLE" in the performance program printout) required to match the actual vacuum specific impulse at the nozzle exit.

Calculation of cooling load distribution.- For the AIM tests, the heat loss distribution was determined from the differences between the skin thermocouples inbedded in the engine surfaces and the cooling water temperatures. Standard heat-transfer equations were used to obtain local heat losses. These losses were then adjusted linearly with the overall heat loss as measured by the overall water temperature rise. The detailed equations and procedures used for these computations are presented in reference 9.

Tare forces.- Purge nitrogen was injected in the AIM cavity between the non-metric "windshield" shroud and the metric outerbody to assure that hot tunnel gases did not enter into this cavity. This method produced a large tare force which was of the same order of magnitude as the engine net thrust. An effort was made to reduce and even control the tare force by suitable control of the pressures in two parts of the cavity. This tare-force control concept was, however, not achieved. Since the thrust is considered the most important measurement in evaluating the engine performance, special tare-force calibration tests were made and the results carefully correlated in order to determine the correction for the measured thrust. The method and procedures are described in detail in references 5 and 9.

External drag.- The external drag was calculated from the summation of pressure and friction forces acting on the external metric surfaces of the AIM. The method and procedures are described in reference 9.

Strut force calculation.- The performance program was originally programmed to calculate strut force based on a theoretical calculation, assuming uniform flow ahead of the strut. This force should be a drag term since, theoretically, pressures downstream of the maximum strut blockage should be lower than upstream. However, test data indicate that this is only true with subsonic combustion. Upon examination of the test data, it appeared that measured static pressures between struts on both the inner and outer walls (there were no measurements along the strut surfaces) could be used to represent the forces occurring on the strut surface. Thus, a pressure integral was used to determine the strut force and a calculation was also made for strut base pressure as discussed in reference 9.

Performance correction for regeneratively cooled system.- The AIM incorporated a water-cooled jacket in which heat was rejected and not recovered. In order to compensate for this heat loss, hydrogen fuel was heated up to 1500°R to simulate a regeneratively cooled system. The deficiency of energy in the system in terms of theoretical energy release was less than 10 percent in all cases.

In order to correct this deficiency, the performance computer program (ref. 6) incorporated a side calculation in which the energy deficiency, because of the heat loss through internal surfaces, was added to the stream at the combustor exit with no total pressure change. The flow was then expanded to the nozzle exit with measured nozzle efficiency. The differences between the heat added to fuel and the internal cooling loss are presented for several tests in reference 9 as table 6.6-1.

Performance correction for inlet total temperature.- Because of the facility heater deterioration, the true temperature simulation of 3700°R at Mach 7 was not achieved (the test Mach number was generally about 7.25 requiring a simulation temperature of about 3960°R). It is known that the effect of decreasing total temperature is to increase the engine performance. Therefore, it is necessary to correct the measured performance for Mach 7 (ref. 11) to properly account for deviations in test conditions. Theoretical calculations indicate that, at Mach 7, a decrease of 560°R would increase the thrust coefficient by 5 percent and the specific impulse by 3.5 percent. The accomplishment of this correction in the performance computer program (ref. 6) employed the methods discussed in reference 9.

Determination of tunnel gas composition.- The oxygen-to-nitrogen ratio was determined from the flow measurements of oxygen, diluent nitrogen, and nitrogen entering the storage heater, and checked by gas samples taken through two aspirating thermocouple probes 180° apart in the facility nozzle entrance prior to each run. The samples were collected in high-pressure bottles and later analyzed on a mass-spectrometer. The measured compositions for each run are presented in reference 9 as table 6.8-1. The one-dimensional performance computer program (ref. 6) used only the N<sub>2</sub> and O<sub>2</sub> values.

## RESULTS

Selected points of interest of the HRE/AIM test data have been analyzed by use of the one-dimensional performance analysis computer program (ref. 6). The amount of material generated requires four volumes. Mach 6 component integration results are presented herein. Mach 6 engine performance results, Mach 7 component integration and engine performance results, and Mach 5 component integration and engine performance results are presented in references 10 to 12, respectively. All of these results were used in references 7 through 9 in the discussion of the results of the AIM test program.

## Selected Test Points for Performance Analysis

Details of the AIM tests were discussed in reference 5 which included a list of all the HRE/AIM tests; this list is contained herein as table 1 (included in each volume). The individual AIM tests were recorded as consecutive reading numbers that extended through number 97 for a total operation time of 112 minutes with 41.5 minutes of combustor operation. About 60 successful tests are noted in the first column of table 2.

Reference 5 documented the fuel injection schedules, both planned and measured, for the successful tests. The measured fuel injection schedules for the successful Mach 6 component integration tests are contained herein for convenience in figure 4. Such plots were reviewed and points (run time) of interest were selected for performance analysis. The selected points were listed in reference 9 and are included in table 5(a) for the results presented herein and in tables 5(b) through 5(d) for the results presented in references 10 to 12, respectively, where the times correspond to the abscissa in figure 4. The first column of table 5 indicates the page number of the initial page of the data for a given test point (specific time of a reading number). Table 5 indicates the general test conditions and fuel injection equivalence ratios,  $\phi$ , for the first-, second-, and third stage injectors and the accumulative  $\phi$ -value. Also, the use of ignitors is indicated and the general purpose of the test is noted.

Vagaries in the test program that should be noted (table 5, last column) are:

(1) Fuel equivalence ratio values,  $\phi$ , in table 5 for reading 93 are lower than the values indicated by the fuel injection schedule (fig. 4(a) of ref. 12). In preparation for the performance analysis, the tunnel measured oxygen content was found to be about 34 percent instead of the standard 21 percent; therefore, the fuel equivalence ratios were corrected to account for the difference in the available oxygen for combustion.

(2) Time 235 seconds in reading 90 is for an inlet unstart condition. With an unstart, the captured mass flow is, of course, greatly decreased, and since the fuel flow rate is still high, the  $\phi$ -value would be high as indicated, therefore this time is not very meaningful.

(3) At Mach 7 the agreement between computed thrust (a function of  $f_{pda}$ ) and measured thrust was not nearly as favorable as experienced for Mach 6. Examination of the surface static pressure distributions on the outer combustor surface in the vicinity of the pressure rise indicated some pressure instrumentation to be faulty. For reading 89, more reasonable values were substituted for the measured pressures and the performance recomputed. The recomputation was performed for two different times, 316.47 and 327.27 seconds (see table 5(c)), and the results indicate a much more favorable agreement between the computed and measured thrust. The channel numbers in which new pressure values were substituted are noted on the first page of the results for these two times. A more detailed discussion of this exercise is contained in reference 9 (section 7.7.2 Mach 7 Performance).



(4) Times 264.04, 274.84, and 275.74 seconds of reading 96 had a fuel flow measurement malfunction that indicated no fuel flow from injector 1B. Injector 1B manifold pressure, however, indicated flow to exist at pressure levels about equal to planned pressure levels ( $\phi$ -values about the same as for injector 1A). The performance calculations for these times of reading 96 erroneously used only fuel flow from injector 1A.

(5) At time 313.54 seconds, also of reading 96, the test chamber pressure was noted to be high, thus yielding unrealistically high pressures on the AIM nozzle shroud and plug that would, of course, contribute erroneously to increased engine thrust.

### Description of Performance Computer Results

The selected points listed in table 5 were analyzed using the performance computer program described in reference 6. As noted in the Method of Computation section, the AIM test data were reduced to engineering units and reviewed for erroneous data. Such data were "coded out" in the performance computer program. Table 6 indicates the channels that were coded out. The COXX indicates the code outs for a reading number, e.g., for reading 33, C033 is indicated. Channels that are coded out are listed adjacent to the notation KODSEL, e.g., for reading 33 the first and last of 85 coded out channels are 60 and 399, respectively. The locations and type of measurement for the listed channels may be determined by referring to table 4.

Several points (run time) of interest were selected for each run as indicated in table 5. The page numbers indicated in the first column of table 5 are output listings of the performance computer program (ref. 6). For each time of interest there are seven or eight pages of computer output listings. On each of these pages a standard heading exists: READING number (test number); BLOCK number (numbered sequentially and corresponding to recording times of test data); TIME (of data recording, seconds); MACH number (in wind tunnel); PT (total pressure in wind tunnel, psia); TT (total temperature in wind tunnel,  $^{\circ}$ R); and PAGE number.

Station flow parameters.- A summary of flow parameters at each calculation station in the AIM is contained on pages 1, 2, and 3. Each station is headed by a station designator (i.e., WIND TUNNEL, INLET THROAT, COMBUSTOR, etc.), followed by three integers (the zero following the combustor designator is meaningless). The first integer denotes the station number, the second denotes the combustor station, and the third denotes the number of iterations required to converge on a solution. The third integer may assume values between 0-21, 100-121, and 200-221. A value of the third integer equal to 21 denotes that the mass flow was too great or the flow area too small to obtain a solution, 121 denotes that the solution for total conditions did not converge in 21 iterations and 200-221 denotes that the mass flow was too small or the flow area too large to obtain a solution. When both solutions for static and total conditions have converged, the third integer may assume the values 1-20 or 101-120 depending upon which solution (static or total) required the larger number of iterations. Columns 2-8 have two rows of values for each station; total and static conditions in first and second rows, respectively.

Most of the station designators are self-explanatory. The first appearance of the designators WIND TUNNEL and SPIKE TIP NS (NS = NORMAL SHOCK) reports conditions in wind tunnel and upstream of the spike tip based on a wind tunnel Mach number determined from calibration runs. The second appearance of these designators reports these conditions based on a wind-tunnel Mach number calculated from the total and pitot pressures and the total temperature of the synthetic air applied to the normal shock equations. The designators INLET UPNRSK and INLET DNNRSK denote conditions upstream and downstream of a normal shock positioned at a fictitious flow area 1.10 times the flow area at the inlet throat. The designator COMBUSTOR REGEN denotes, for cases with fuel flow, conditions at the combustor throat simulating a regeneratively cooled ramjet. In some cases (e.g., reading 94 time 150.342 sec) the designator SONIC THROAT appears ahead of the COMBUSTOR REGEN. This denotes the results discussed in section entitled "Description of Performance Program Methods." NOZZLE AE and NOZZLE PO report conditions when the flow is expanded isentropically to the nozzle exit area and to the wind-tunnel static pressure, respectively. NOZZLE AE REGEN and NOZZLE PO REGEN denote, for cases with fuel flow, conditions at the nozzle exit simulating a regeneratively cooled ramjet. FICTIVE COMBUSTOR denotes stagnation combustion conditions (zero velocity and constant pressure) with combustor efficiency equal to unity. FICTIVE NOZZLE reports conditions required to match the actual momentum and nozzle exit area.

Definition and units of parameters in the SUMMARY REPORT, pages 1-3 in the computer listings, are listed below:

P - pressure, psia	W/A - flow rate per unit area, $\text{lb}_m/\text{sq in}$
T - temperature, $^{\circ}\text{R}$	W - flow rate, $\text{lb}_m/\text{sec}$
H - enthalpy*, $\text{Btu}/\text{lb}_m$	A/AC - mass flow ratio
GAMMA - specific heat ratio	MOMTM - flow momentum, $\text{lb}_f$
MOLWT - molecular weight	Q - dynamic pressure, $\text{lb}_f/\text{sq in}$
SONV - conic velocity, $\text{ft}/\text{sec}$	IVAC - vacuum specific impulse, $\text{lb}_f\text{-sec}/\text{lb}_m$
MACH - Mach number	PHI - equivalence ratio (see discussion in Ramjet Performance section)
VEL - flow velocity, $\text{ft}/\text{sec}$	ETAC - combustor efficiency
S - entropy, $\text{Btu}/\text{lb}_m\text{-}^{\circ}\text{R}$	

\*Two values were reported. The first value (column 4) was the JANNAF-based enthalpy. The value in parentheses (column 5) was the enthalpy potential or the sensible enthalpy based on the equation

$$\sum_i \int_0^T C_{p,i} dT \sigma_i(T) = \sum_i H_{f,i}^{298} + \int_{298}^T C_{p,i} dT \sigma_i(T)$$

$$- \sum_i H_{f,i}^{298} + \int_{298}^{300} C_{p,i} dT \sigma_i(T) + \sum_i \int_0^{300} C_{p,i} dT \sigma_i(T)$$

where:  $C_{p,i}$  is specific heat at constant pressure,  $\text{Btu}/\text{lb}_m - ^{\circ}\text{R}$ , and  $\sigma_i(T)$  is the mass fraction of the specie  $i$  as a function of temperature and  $H_f$  is fuel enthalpy.

Cooling and surface-pressure parameters.- Surface pressures, cumulative surface-pressure integrals, cumulative cooling losses, cumulative surface area, and pressure ratios for axial distances from the AIM virtual spike tip are listed on pages 4 and 5.

Definitions and units of the parameters are as follows:

XABS - axial distance from virtual spike tip, in  
P-IB - surface pressure on innerbody, psia  
P-ØB - pressure on cowl inner surface, psia  
PDA - cumulative surface-pressure integral,  $\int_0^{X_{ABS}} P dA$ , lbf  
QØX - cumulative total cooling loss, Btu/sec  
Q-IB - cumulative cooling loss from innerbody, Btu/sec  
Q-ØB - cumulative cooling loss from outerbody, Btu/sec  
CAWALL - cumulative surface area, sq in  
P-IB/PSØ - innerbody static to wind-tunnel static-pressure ratio  
P-IB/PTØ - innerbody static to wind-tunnel total-pressure ratio  
PØB/PSØ - outerbody surface static to wind-tunnel static-pressure ratio  
PØB/PTØ - outerbody surface static to wind-tunnel total-pressure ratio

Drag and heat-transfer coefficients.- Longitudinal values of drag force and drag and heat-transfer coefficients are listed on page 6 (for some cases on page 6 and 7). Definition and units of the parameters are as follows:

X - axial distance from spike virtual tip, in  
DDRAG - incremental frictional drag force, lbf  
CDRAG - cumulative frictional drag force, lbf  
C<sub>F</sub> - friction-drag coefficient  
HC - heat-transfer coefficient, Btu/(sec-sq ft-°R)

Ramjet performance.- AIM performance parameters and pertinent information are contained on page 7 (page 8 for some cases). The performance parameters are generally self-explanatory; detailed discussion about the methods of computation are presented in references 6 and 9. Parameters listed below STATIONS are presented since they are related (except for the inlet throat) to the cowl leading-edge station. The NOMINAL COWL LEADING EDGE refers to the  $x_{CL}$  (table 3) value for the Mach 6 design operating position. SPIKE TRANSLATION is the recorded distance between the nominal and the actual  $x_{CL}$  value (this distance is designated as  $\Delta\Delta x$  in symbols and used in figure 3(a)); all dimensions other than those for the inlet spike are corrected by this amount.

The fuel injectors and their corrected stations in inches are shown. A letter in the VALVE column indicates the injectors that were in use during the respective time. Table 5 indicates the general fuel equivalence ratio values for the various injector stages. The actual fuel equivalence ratio, however, for each injector can be determined by noting the step increases in the PHI column on the output, pages 1-3, for the respective time (ignore 0.01 or 0.02 changes); the step difference at the combustor station corresponding to the indicated injector station is the  $\phi$ -value for the respective injector.

## SUMMARY OF TESTS

The Hypersonic Research Engine/Aerothermodynamic Integration Model was tested in the NASA Hypersonic Tunnel Facility at the Plum Brook Station of the NASA Lewis Research Center. Synthetic air (heated nitrogen with proper amount of oxygen added) was delivered by the facility at nominal Mach numbers of 5, 6, and 7. The Mach 5 and 6 tests were conducted at true air temperature while Mach 7 tests were conducted at Mach 6 temperature (3000° R) because of heater deficiency. Changes in total temperature and instream oxygen content at Mach 5 and 7 were also explored. The hydrogen fuel was heated up to 1500° R prior to injection to simulate a regeneratively cooled system.

The engine testing was completed with an accumulated actual running time of about 112 minutes with 41.5 minutes of combustor operation. The important achievements realized from this test program which advanced the state-of-the-art in hypersonic propulsion were discussed in detail in reference 9 and are:

1. Realistic engine performance levels for hypersonic flight were obtained from Mach 5 to 7.

<u>Test Mach No.</u>	<u>Equivalence Ratio</u>	<u>Internal Thrust Coefficient</u>	<u>Internal Specific Impulse</u>
5.1	1.0	0.910	2740
6.0	1.0	0.735	2360
7.25	1.0	0.570	2170

2. Engine inlet performance agreed well with theoretical prediction. Combustor efficiency of 95 percent was achieved. Nozzle vacuum thrust coefficient was lower than predicted.
3. The interaction effects in staged fuel injection were very important in achieving auto-ignition, high combustor efficiency, and overall performance. High supersonic combustor efficiency in a diverging duct was difficult to achieve. The strong stage interaction effects discovered during these tests may be used to great advantage in future designs.
4. The "transonic combustion" or "mixed combustion mode" was the most efficient heat addition process in the range of Mach numbers and temperatures tested in this program.
5. The effects of ignitors, altitudes, spike translation, fuel schedules, angle of attack, step and struts, inlet gas composition, inlet total temperature, and component interactions were investigated and correlated.

6. Stable subsonic and supersonic combustion and convertibility over a range of fuel equivalence ratios at Mach 5 and 6 was demonstrated.
7. The overall cooling load and its distribution as compared with theoretical prediction was determined.
8. Experience was acquired in free jet testing in a ground test facility with large model blockage and combustion.

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Table 1. - Summary of planned HRE/AIM wind tunnel tests.

(obtained from ref. 9 and 15)

RUN	M <sub>0</sub>	PTO, PSIA	TTO, °R	$\alpha$	FUEL SYSTEMS	FUEL SCHED.	INLET $\Delta x$ , IN.	COMBUSTION MODE	RUN TYPE AND PURPOSE
1	6	466	1500	0	-	-	4.23	-	Purge force, nominal case
2	6	466	1500	0	-	-	1.90	-	Purge force, effect of spike position
3	6	466	1500	3	-	-	4.23	-	Purge force, effect of angle of attack
4	6	466	2000	0	-	-	4.23	-	Operation checkout, effect of higher TTO
5	6	466	3000	0	-	-	0, 1.71, 2.52 4.23, aft stop	-	Airflow calibration, effect of altitude
6	6	930	2946	0	-	-	0, 1.71, 2.52 4.23, aft stop	-	Airflow calibration, nominal case
7	6	930	2946	3	-	-	0, 1.71, 2.52 4.23, aft stop	-	Airflow calibration, effect of angle of attack
8	6	930	2946	0	1a, 1b	1	4.23	Supersonic	Inlet-combustor performance, ignition and inlet unstart limits
9	6	930	2946	0	1a, 1b, 2a, 2c	2	4.23	Supersonic	Inlet-combustor performance, injector optimization
10	6	930	2946	0	1c, 4, 2a, 2c	2	4.23	Supersonic	Inlet-combustor performance, injector optimization
11	6	930	2946	0	1a, 1b, 1c, 4	3	4.23	Supersonic	Inlet-combustor performance, injector optimization
12	6	930	2946	0	T80	T80	4.23	Supersonic	Inlet-combustor performance, injector optimization
13	6	466	3000	0	1a, 1b, 2a, 2c	2	4.23	Supersonic	Inlet-combustor performance, effect of altitude
14	6	700	3000	0	1a, 1b, 2a, 2c	2	4.23	Supersonic	Inlet-combustor performance, effect of altitude
15	6	930	2946	0	1a, 1b, 2a, 2c	2	Aft stop	Supersonic	Inlet-combustor performance, effect of spike position
16	6	930	2946	0	1a, 1b, 2a, 2c	2	2.52	Supersonic	Inlet-combustor performance, effect of spike position
17	6	930	2946	0	1a, 1b, 2a, 2c	2	1.71	Supersonic	Inlet-combustor performance, effect of spike position
18	6	930	2946	0	3a, 3b	4	4.23	Subsonic	Inlet-combustor performance, subsonic combustion
19	6	930	2946	0	3a, 3b	5	4.23	Subsonic & transition	Engine performance, subsonic combustion and transition
20	6	930	2946	0	1a, 1b, 2a, 2c	2	4.23	Supersonic	Engine performance, nominal case
21	6	466	2946	0	1a, 1b, 2a, 2c	2	4.23	Supersonic	Engine performance, effect of altitude
22	6	930	2946	3	1a, 1b, 2a, 2c	2	4.23	Supersonic	Engine performance, effect of angle of attack
23	7	520	1500	0	-	-	2.88	-	Purge force
24	7	520	3965	0	-	-	2.34, 2.88 3.24	-	Airflow calibration, effect of altitude
25	7	1000	3840	0	-	-	1.98, 2.88 3.24	-	Airflow calibration, nominal case
26	7	1000	3840	3	-	-	2.34, 2.88 3.24	-	Airflow calibration, effect of angle of attack
27	7	520 & 1000	3965 3840	0	1a, 1b	6	2.88	Supersonic	Inlet-combustor performance, ignition and inlet unstart limits
28	7	1000	3840	0	1a, 1b, 2a, 2c	7	2.88	Supersonic	Inlet-combustor performance, injector optimization
29	7	1000	3840	0	1c, 4, 2a, 2c	7	2.88	Supersonic	Inlet-combustor performance, injector optimization
30	7	1000	3840	0	1a, 1b, 1c, 4	8	2.88	Supersonic	Inlet-combustor performance, injector optimization
31	7	1000	3840	0	T80	T80	2.88	Supersonic	Inlet-combustor performance, injector optimization
32	7	522	3965	0	1a, 1b, 2a, 2c	7	2.88	Supersonic	Inlet-combustor performance, effect of altitude
33	7	700	3965	0	1a, 1b, 2a, 2c	7	2.88	Supersonic	Inlet-combustor performance, effect of altitude
34	7	1000	3840	0	1a, 1b, 2a, 2c	7	3.24	Supersonic	Inlet-combustor performance, effect of spike position
35	7	1000	3840	0	1a, 1b, 2a, 2c	7	2.34	Supersonic	Inlet-combustor performance, effect of spike position
36	7	1000	3840	0	1a, 1b, 2a, 2c	7	1.98	Supersonic	Inlet-combustor performance, effect of spike position
37	7	1000	3840	0	1a, 1b, 2a, 2c	7	2.88	Supersonic	Engine performance, nominal case
38	7	522	3965	0	1a, 1b, 2a, 2c	7	2.88	Supersonic	Engine performance, effect of altitude
39	7	1000	3840	3	1a, 1b, 2a, 2c	7	2.88	Supersonic	Engine performance, effect of angle of attack
40	5	445	1500	0	1a, 1b, 2a, 2c	-	4.23	-	Purge force
41	5	206	2210	0	1a, 1b, 2a, 2c	-	4.23	-	Airflow calibration
42	5	415	2210	0	1a, 1b, 2a, 2c	9	4.23	Supersonic	Inlet-combustor performance, nominal case effect of altitude
43	5	415	2210	0	1a, 1b, 2a, 2c	T80	4.23	Supersonic	Inlet-combustor performance, and ignitor flow rate
44	5	415	2210	0	1a, 1b, 2a, 2c	9	4.23	Supersonic	Engine performance, supersonic combustion
45	5	415	2210	0	3a, 3b	10	4.23	Subsonic	Engine performance, subsonic combustion
46	5	415	2210	3	1a, 1b, 2a, 2c	11	4.23	Subsonic & Supersonic	Engine performance, effect of angle of attack

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Run No.	Reading No.	Date	Inlet Condition			Inlet Spills Position, $\Delta x$ , in.	Fuel Injectors Used	★ Tunnel Config.	Time			Objective of Test	Comments
			Mach No.	$P_{T0}$ , psia	$T_{T0}$ , °R				Run	Useful			
1	1 through 5	9/14/72	-	-	-	-	-	A	-	-	-	Pre-run reference for air flow engine. Purge system calibration checkout.	Data not valid due to mechanical interference between AIM and outer coil body
2	6	10/31/72	6	466	1500/2100	4.266	-	A	-	40	-	Facility and engine checkout	Test terminated due to cooling system overpressure abort system failure.
3	7	11/1	6	466	1500	4.266	-	A	2	26	-	Same as run 2	Tunnel nozzle started. Inlet started. Strong shocks in test section. Cell pressure = 2.0 psia.
4	8	11/2	6	466	1500	4.266	-	A	-	5	-	Establish facility operational procedure	Test aborted due to facility problem (TAPP).
5	9	11/16	6	466	1500	4.266	-	B1	-	-	-	Same as run 4	Facility shroud extended and washer added to assist tunnel start (TAPP).
	10	11/16	6	466	1500	4.266	-	-	-	-	-	Same as run 4	TAPP
	11	11/16	6	466	1500	4.266	-	-	2	39	-	99	Nozzle start and inlet start obtained. Cell pressure = 1.2 psia. Wedge nozzle pressure changed from 50 to 60 psia. No improvement in cell pressure.
6	12	11/21	6	466	2250	3.962	-	B1	-	-	-	Same as run 4	TAPP
13	13	11/21	6	466	2250	3.962	-	-	1	07	-	-	Wedge nozzle pressure 55 to 90 psig. No tunnel nozzle start. Nozzle started when inlet closed for shutdown.
7	14	11/21	6	466	2950	3.962	-	B1	-	34	-	-	TAPP
8	15	12/8/72	6	466	2950	4.266	-	-	-	16	-	-	TAPP
9	16	1/18/73	6	466	2800	4.266	1C, 4	B1	-	35	-	-	TAPP
17	17	-	-	-	-	-	1C, 4	-	1	06	-	-	First combustion attempt. TAPP
18	18	-	-	-	-	-	1C, 4	-	1	00	-	-	Nozzle start not obtained. TAPP
													Nozzle start obtained by cycling inlet spika open and closed. Inlet start obtained. Fuel ramped to equivalence ratio = .25 prior to tunnel unstart and TAPP.
10	19	2/2	6	466	2950	0.99/4.00	-	B1	-	13	-	-	Nozzle start with inlet partially open. ( $\Delta x = 0.99$ ). TAPP. No fuel injected.
11	20	2/2	6	466	2950	0.99/4.00	1C, 4	B1	1	02	-	-	No start at $\Delta x = 0.99$ . Nozzle started by cycling inlet spika. Combustor lit causing tunnel unstart.
12	21	2/15/73	6	750	3000	0.99/4.00	-	C1	-	-	-	-	Jet pump installed. Test aborted due to freezing of coolant supply system.
13	22	2/21	6	750	3000	0.99/4.00	-	C1	-	22	-	-	Jet pump used for this test. Nozzle start obtained. Unstart experienced when inlet was opened. Test aborted manually. Nozzle restart noted during shutdown.
14	23	2/21	6	750	3000	0.99/4.00	-	C1	-	58	-	-	Jet pump and wedge nozzle inlet pressure varied. Nozzle start was not obtained. Use of jet pump did not affect test chamber pressure. Seals between AIM support struts and facility shroud blown out.
15	24	2/23	6	750	3000	0.99/4.00	-	C2	-	-	-	-	Jet pump inactivated. TAPP
25	25	2/23	6	750	3000	0.99/4.00	-	C2	-	-	-	-	TAPP
26	26	2/23	6	750	3000	0.99/4.00	1A, 1B	C2	-	49	-	-	Nozzle start and engine start obtained. Fuel injected for 4 seconds prior to nozzle unstart. Unstart attributed to excessive fuel injected caused by facility valve malfunction.
16	27	3/1	6	930	3100	0.99/4.00	-	C2	1	42	-	-	Nozzle start and inlet start obtained. Jet pump inactivated. Fuel was injected. engine inlet unstart experienced 12 seconds later. Inlet start reestablished and fuel again injected. Inlet unstart experienced 9 seconds later. Test was manually aborted. Cool leading edge assembly separated from the outer body. Cause of the separation was attributed to failure of the screw heads. The failure was caused by overheating of the screw heads. The failure resulting from ingesting the hot tunnel environment into this area. Ingestion of tunnel ambient was the result of a shock standing on the AIM coil.
													Additional diagnostic instrumentation was installed in the facility shroud and diffuser.
17	28	3/16	6	930	3100	0.99/4.00	1A, 1B	B2	1	11	-	-	Tunnel configuration same as config. B except washer inside diameter changed to 14.5 inches. Tunnel unstart experienced 19 seconds after inlet start. Inlet start reestablished. Test manually aborted 3 seconds later when excessive heating of HRE-A11 cool leading edge assembly mount flange was noted. Excessive heating of the external skin of the AIM was noted.

\* see figure 5-9, reference 5

Table 2. - Continued.

Run No.	Reading No.	Date	Inlet Condition			Inlet Spike Position, $\Delta x$ , in.	Fuel Injector Used	Tunnel Config.	Time			Objective of Test	Comments	
			Mach No.	P <sub>T0</sub> , Psia	T <sub>T0</sub> , °R				Run	Useful				
18	29	3/22	6	930	3100	0.99/4.00	1A, 18	C1	-	36	-	Same as run 17 above	Re-run of reading 23 with seal repaired. Jet pump did not improve tunnel start.	
19	30	4/27	6	750	2000	0.99/4.00	Fuel Injec. not planned	D	0	16	-	Same as run 17 above	Shroud inlet washer replaced with cone-cylinder and 15° conical diffuser inlet contraction replaced with 7° cone; tunnel nozzle did not start.	
20	31	4/30	6	750	2000	0.99/4.00	Fuel Injec. not planned	E	-	51	-	Establish operational procedure	First run with fully started tunnel. Shroud inlet cone cylinder replaced with original 46 in. diameter washer. Tunnel start obtained when inlet spike was cycled twice; supersonic flow in diffuser. Test terminated when target conditions achieved due to limited supply of nitrogen. Test cell pressure was 1.2 psia.	
21	32	4/30	6	750	2000	0.99/4.00	Fuel Injec. not planned	E	1	42	-	Determine effect of varying wedge nozzle flow	Tunnel config. identical to run 20. Tunnel start obtained when inlet spike cycled twice. Test cell pressure of 1.0 psia obtained. Wedge nozzle has negligible effect on cell pressure.	
22	33	5/4	6	750		0.99/4.00	1A, 18, 2A, 2C	E	1	25	-	Investigate inlet unstart limit with first stage combustion	First successful supersonic combustion run. Intentional inlet unstart when first stage equivalence ratio reached 0.34. No second stage fuel added. O-ring between the outerbody and the coil leading edge extruded.	
23	34	5/15/73	6	750/930	3000	0.99/4.00	1A, 18, 2A, 3A	E	2	08	-	Checkout A1H and facility. Fuel rich at P <sub>T0</sub> = 750 psia $\phi$ = 1.0 at P <sub>T0</sub> = 950 psia	Tunnel start and inlet start obtained. $\phi$ of 1.35 set at P <sub>T0</sub> = 150 psia and $\phi$ of 1.00 set at P <sub>T0</sub> = 950 psia. Facility fuel control valve for injector 18 oscillated. Run proved A1H and tunnel can operate at $\phi > 1.0$ . Erosion of zirconium oxide coating on outer coil body crossover manifold noted. Erosion caused by carbon dust in tunnel flow.	
24	35	5/16/73	6	750	3000	0.99/4.00	1A, 18, 2A, 2C	E	-	25	-	Checkout A1H and facility. Design injector locations	Test was aborted when engine inlet unstart was observed three seconds after initiation of fuel injection. The engine unstart was result of injecting excessive fuel, caused by malfunction of facility control valve. Inspection of the unit revealed that the coolant leak on the spike assembly had progressed, and repair was necessary.	
25	36	5/24	6	750	3000	0.99/4.00	1A, 18, 2A, 2C	E	2	19	1	35	Demonstrate operation with design injector location and determine auto ignition limit	First good run with design injector locations. Auto ignition obtained at $\phi = 0.55$ ; first stage did not light until second stage fuel added. Overall $\phi$ ramped to 1.0 with first stage $\phi$ held at 0.24.
26	37	5/30/73	6	750	3000	0.99/4.00	-	E	-	-	-	Determine effect of first stage $\phi$ on combustor performance	Test aborted due to malfunction of the steam ejector system	
27	38	5/30	6	750	3000	0.99/4.00	1A, 18, 2A, 2C	E	-	47	-	26	Determine effect of first stage $\phi$ on combustor performance	Test aborted when inlet unstarted. Malfunction of the facility fuel control valve resulted in injecting excessive fuel into injector 2C. 3 small cracks in spike skin in region of ignitors found in post run inspection. Cracks repaired to prevent water leak into combustor.
28	39 thru 46	-	-	-	-	-	-	E	-	-	-	Purge system calibration test		
29	49	10/4/73	6	750	3000	-	-	E	-	-	-	Combustor optimization	TAP	
30	50	10/5/73	6	750	3000	-	-	-	-	-	-	Combustor optimization	TAP	
31	51	10/5/73	6	750	3000	0.99/4.00	1A, 18, 2A, 2C	E	2	39	2	09	Combustor optimization	Fuel control problems encountered.
32	52	10/10/73	6	750	3000	0.99/4.00	1A, 18, 2C, 4	E	1	21	-	50	Combustor optimization	Investigating performance improvement due to injecting fuel closer to inlet. Inlet unstarted at overall $\phi$ of .83.
33	53	10/10	-	-	-	-	-	E	-	-	-	Purge system calibration test. Evacuated test cell.		
34	54	10/11/73	6	750	3000	0.99/4.00	1A, 18, 2A, 2C	E	3	04	2	13	Combustor optimization	Attempt to determine effect of first stage $\phi$ and thrust on performance. Auto ignition obtained at $\phi = .54$ . Data taken with ignitors on and off to determine effect on performance. Inspection of unit revealed excessive coolant leak at spray/ignitor body interface. Repair necessary. Tunnel operating procedure modified to reduce water ingestion into A1H wall pressure taps.
35	55	10/17/73	-	-	-	-	-	E	-	-	-	Purge system calibration evacuated test cell		
36	56	11/2/73	6	750	3000	-	-	E	-	-	-	Combustor optimization	Effect of fuel split between 1st and second stage injectors at overall $\phi = 1.0$ investigated. Also all second stage fuel added from innerbody side (system 2C). Fuel system purges turned off to determine effect on combustor wall pressure distribution. Found that measurement affected by thermal expansion of wall. 18 in. inlet unstarted at overall $\phi$ of 0.13. 1st stage $\phi = 0.36$ . Early run problems up #42. Repair for this run. Exposed fuel control problems up #42. Repair for this run.	

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Table 2. - Continued.

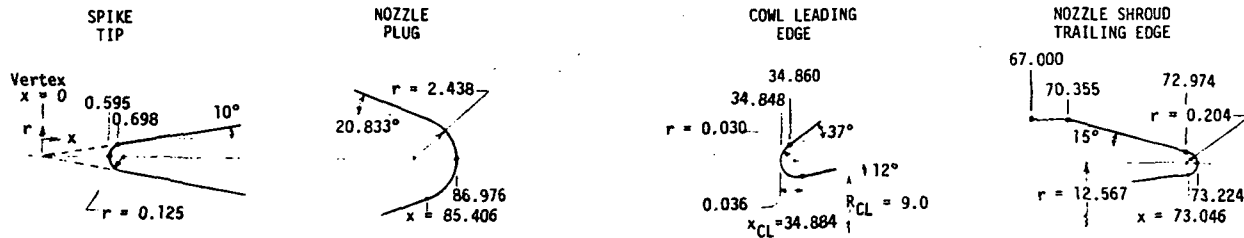
Run No.	Reading No.	Date	Inlet Condition			Inlet Spike Position, $\Delta X_p$ , in	Fuel Injectors Used	Tunnel Config.	Time				Objective of Test	Comments
			Mach No.	P <sub>10</sub> , Pa	T <sub>10</sub> , °R				Run	Useful				
31	57	11/2/73	6	750	3000	0.99/4.00	1A, 1B, 2A, 2C	E	-	-	-	-	-	Determine effect of thermal expansion of fuel manifold 1B.
	58	11/7/74	-	-	-	-	-	-	-	-	-	-	-	TAPP
	59	11/8/73	6	750	3000	0.99/4.00	1A, 1B, 2A, 2C	E	2	34	2	04	-	Overall $\phi$ held constant while amount of fuel from innerbody and outerbody injectors varied. Fuel temperature compensation added to fuel control.
	60	11/8/73	6	750	3000	0.99/4.00	1A, 1B, 2A, 2C	E	2	50	2	21	-	Inlet massflow ratio of 0.81 and 0.58 ran by varying the inlet spike position. AIM wall pressure distribution measured with fuel line purge flow shut off. Remarked section of the innerbody assembly burned and damaged during combustion; damaged section was removed. Operational procedure modified to prevent further damage.
32	61	11/13/73	6	750	3000	0.99/1.75/2.52	1A, 1B, 2A, 2C	E	2	50	2	21	-	TAPP
33	62	11/20/73	6	930/466	3000	-	-	E	-	-	-	-	-	Performance test
	63	11/21/73	6	930/466	3000	0.99/4.00	1A, 1B, 2A, 2C	E	2	59	1	52	-	Tunnel total pressure varied to determine effect of altitude on performance.
34	64	11/28/73	6	750	3000	0.99/4.00	1A, 1B, 2A, 2C, 3A, 3B	E	3	38	2	35	-	Transition from subsonic to supersonic combustion mode demonstrated. Inspection of unit revealed coolant was flowing into the 1B fuel manifold and a nickel plated section of the innerbody had blistered. Separation at the spike skirt-spike body has progressed to approximately 1.0 inches. Forward facing step at the interface of the coil leading edge assembly and the outerbody had progressed to approximately .065 inches. Larger fuel metering venturi installed in fuel system E.
35	65	12/11/73	6	750	3000	4.00	1A, 1B, 2A, 2C	E	2	52	1	44	-	Instrumentation cable installed. Cable caused tunnel to unstert at $\phi = 1.05$ . Exhaust gas sampling data taken.
	66	12/14	-	-	-	-	-	E	-	-	-	-	-	TAPP
36	67	12/14	-	-	-	-	-	-	-	-	-	-	-	Mg purge force calibration with cell evacuated.
	68	12/14/73	6	750	3000	-	-	-	-	-	-	-	-	Time of steady state fuel flow increased to 20 seconds to allow gas sampling data to stabilize.
	69	12/14/73	6	750	3000	4.00	1A, 1B, 2A, 2C	E	3	20	2	17	-	One tunnel unstert experienced near end of run. Several tunnel unsterts prevented by shutting off fuel. Incident unstert detected by monitoring luminescent normal shock position in T.V. view of tunnel.
	70	12/19/73	6	750	3000	-	-	E	-	-	-	-	-	Test terminated prematurely due to frozen vent valve.
47	71	12/19/73	6	750	3000	4.00	1A, 1B, 2A, 2C	-	3	56	2	29	-	Coil leading edge assembly removed after this run to remove facing step noted after reading 64.
	72													Calibration with 1B fuel injector manifold heated test cell
49	73, 74, 75	1/22/74	7	1000	3200	-	-	F	-	-	-	-	-	Test aborted due to facility problems (TAPP)
	76	1/23/74	7	1000	3200	-	-	F	-	-	-	-	-	TAPP
48	77	1/23/74	7	1000	3200	2.57	-	F	2	-	-	-	-	Attempt to start tunnel at Mach 7 unsuccessful. Secondary steam ejector used; wedge nozzle pressure varied; inlet spike assembly translated.
	78	1/25/74	7	1000	3500	2.57	-	G	2	-	-	-	-	Test aborted while attempting tunnel start. TAPP. Unusual amount of carbon dust deposited on AIM.
51	79	2/15/74	7	1000	3100	-	-	G1	-	-	-	-	-	AIM moved aft 5.5 inches.
	80	2/15/74	7	1000	3100	2.57	-	G1	-	-	-	-	-	TAPP (down water system frozen).
50	81	2/20/74	7	1000	3300	2.57	2A, 2C	G2	2	38	-	-	-	Blowout doors installed in tunnel closure. Tunnel started when wedge nozzle pressure reduced. Tunnel unsterted when combustor lit. Restart not obtained due to change in wedge nozzle inlet pressure.
	82	2/22/74	7	1000	3300	-	-	G2	-	-	-	-	-	TAPP. Seal around outer coil body support damaged.
51	83	2/22/74	7	1000	3300	2.57	-	G2	2	05	-	-	-	Tunnel start not obtained.
	84, 85, 86	2/28/74	7	1000	3300	-	-	G2	-	-	-	-	-	TAPP
	87	2/28/74	7	1000	3300	2.57	1A, 1B, 2A, 2C	-	2	46	1	30	-	Tunnel nozzle started. Unsterted at $\phi = 0.8$

Table 2. - Concluded.

Run No.	Reading No.	Date	Inlet Condition			Inlet Spike Position, $\Delta X_g$ in.	Fuel Injectors Used	Tunnel Config.	Time			Objective of Test	Comments
			Mach No.	P <sub>0</sub> , Psia	T <sub>0</sub> , °F				Run Min	Useful Min	Sec		
52	88	2/28	7	1000	3100	2.57	1A, 1B, 2A, 2C	F	2	45	1 31	Combustion evaluation	First successful Mach 7 run. Tunnel closure removed. Diffuser seal repaired. Effect of fuel injection location investigated. Row 2 ignitors on. Outer coil body support damaged by carbon particles in tunnel flow due to failure of carbon part in facility heater. Shroud inlet pressure rake hit and damaged. Replaced outer coil body support and water cooled protective wedge installed. Coolant leak at the interface of spike skirt and spike body noted at angular location 270° in addition to leak at 180 degrees noted in Rdg 64. Leak at 180° progressed to approximately 1.25 inches. Cool leading edge tip radius and spike tip damaged by particles. Damaged areas removed.
53	89	3/15/74	7	1000	3000	2.57	1A, 1B, 2A, 2C, 4	F	3	-	2 02	Combustor optimization	Performance measured with various fuel injection schemes. Tip radius of ignitors on Row 2 deteriorated. Fuel control valve to failure of transducer in fuel control causing fuel control valve to fully open. Abnormal amount of carbon dust observed in tunnel flow. Cool leading edge tip radius and spike tip again damaged. Tip section repaired.
54	90	3/8/75	7	1000	3000	2.57	1A, 1B, 1C, 4	F	3	09	1 16	Combustor optimization	Second stage fuel injection closer to inlet (injectors 1C, 4). Inlet unstarts encountered.
55	91	3/12/74	7	1000	3000	2.57	1A, 1B, 2C, 4	F	2	52	1 32	Effect of angle of attack	Tunnel start improved at angle of attack. Tunnel started at P <sub>0</sub> = 850 psia. 3 inlet unstarts encountered due to excessive 1st stage fuel. Total coolant leak into combustor estimated to be 5.0 gpm.
56	92	3/18/74	7	1000	2900	2.57	1A, 1B, 2C, 4	F	3	50	2 30	Combustor performance with instrumentation rake installed.	Instrumentation rake blockage had adverse effect on tunnel start. Inlet spike stroked twice to start tunnel. Oxygen content of tunnel flow varied while AIN exhaust gas sampling data taken.
57	93	3/27/74	5	415	2210	4.00	1A, 1B, 2A, 3A, 3B	F	0	85	-	Facility check-out	First Mach 5 run. Subsonic combustion data obtained. Run terminated prematurely (TAPF).
58	94	3/28/74	5	(a) 415 (b) 300 (c) 206	2210	4.00	1A, 1B, 2A, 3A, 3B 1A, 1B, 2A, 3A, 3B 1A, 1B, 2A, 3A, 3B	F	2	25	2 01	Combustor optimization	Subsonic and supersonic combustion and transition demonstrated. Four unstarts experienced, three unstarts attributed to high cell pressure, one to injecting excessive fuel intentionally into the AIN. More carbon in tunnel flow. Cool leading edge and spike tip damaged. Both remarked.
59	95	3/29/74	5	415	2210	4.00	1A, 1B, 2A, 2C, 3A, 3B	F	3	41	3 20	Combustor optimization	All comments made for Rdg 94 applicable for this run, except combustion was limited to supersonic combustion mode. Four engine unstarts experienced, three unstarts were attributed to facility conditions and the other to programmed to determine inlet unstart limit.
60	96	4/15	5	415	2210	4.00	1A, 1B, 2A, 3A, 3B	F				Evaluate effects of angle of attack	Subsonic and supersonic combustion and transition demonstrated at angle of attack. Intentional engine unstart obtained when excessive fuel was injected in supersonic combustion mode.
61	97	4/22	5	206/ 415	2210	4.00	2A, 3A, 3B	F				Combustor performance with instrumentation rake installed	Combustor exit flow conditions surveyed. Gas sampling data taken. Blockage of instrumentation rake had adverse effect on tunnel operation.

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Table 3. - AIM aerodynamic coordinates  
(Mach 6 cowl position,  $x_{CL} = 34.844$  in.)



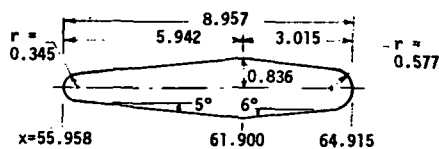
a) Centerbody

x, in.	r, in.	
0.595	0.0	90°
0.698	0.123	st. line
18.360	3.237	10°
19.304	3.411	
20.443	3.633	
21.691	3.885	
22.830	4.122	
23.850	4.338	
25.875	4.782	
26.766	4.985	
27.900	5.256	
28.904	5.518	
29.655	5.726	
30.360	5.926	15.819°
32.760	6.660	
34.080	7.140	
37.710	8.607	22.0°
38.070	8.734	
38.538	8.874	
38.826	8.942	
39.132	9.000	
39.780	9.096	
40.500	9.180	5.645° Throat
42.000	9.318	
43.400	9.415	
44.000	9.452	
45.000	9.518	
46.000	9.578	
47.000	9.624	
47.600	9.650	
48.400	9.670	
55.760	9.670	End of spike; step
55.760	9.406	Thermal throat
61.900	9.406	
65.740	9.406	
67.553	9.072	
85.406	2.278	20.833°
86.976	0.0	90°

b) Outerbody

x, in.	r, in.	
40.894	11.611	
36.750	10.103	
36.250	9.975	
36.000	9.808	
35.750	9.685	
35.437	9.487	37°
34.860	9.053	
34.848	9.029	90°
34.884	9.000	12°
35.397	9.104	
35.874	9.192	10°
36.171	9.241	
36.414	9.278	8°
36.765	9.322	
37.494	9.398	
40.500	9.695	5.645°
40.894	9.720	
41.894	9.810	
42.894	9.890	
43.894	9.960	
46.294	10.132	
55.760	10.873	
57.000	10.955	
58.000	11.000	
58.700	11.022	
61.900	11.022	Thermal throat
65.980	11.022	
66.220	11.042	
66.740	11.132	
67.740	11.348	
68.780	11.572	
69.740	11.773	
70.820	11.989	
71.660	12.146	
72.260	12.249	
72.920	12.349	
72.980	12.357	
73.046	12.365	
73.224	12.567	90°
72.974	12.791	
70.355	13.493	15°
67.000	13.493	

c) Internal struts (6)



(d) Cowl lip design positions

	$x_{CL}$ , in.	$\Delta x$ , in.	$x_{CL}/R_{CL}$
Close off	39.150	0.0	4.350
Inlet start	38.160	0.990	4.240
Mach 8	36.990	2.160	4.110
Mach 7	36.270	2.880	4.030
Mach 4 - 6	34.884	4.266	3.876

Table 4. - HRE/AIM Instrumentation  
(obtained from ref. 5).

(a) Coding for instrumentation list.

The code for the instrumentation listed in the "Identification" column is as follows: Sample, S-P-14.492-0<sup>0</sup>11'-90-3 (A-B-C-D-E-F).

"A" designates the component on which the instrumentation is located:

S = inlet spike assembly  
I = innerbody assembly  
NP = nozzle plug assembly  
CO = cowl leading edge assembly (outside)  
C = cowl leading edge assembly (combustor side)  
O = outerbody  
N = nozzle shroud (combustor side)  
NO = nozzle shroud (outside)  
CE = combustor exit  
EF = engine airflow-metering duct  
F = fluids

"B" designates type of instrumentation

P = pressure  
T = temperature

"C" designates the location of the instrumentation in terms of station, with the inlet spike assembly positioned for testing at Mach 6 condition.

"D" designates the angular location in degrees and minutes.

"E" designates position of the pressure pickup with respect to airflow in degrees, or, if the instrument is a temperature sensor, it designates the thermocouple:

CA = chromel alumel  
CuC = copper constantan  
P/rh = platinum-platinum/rhodium

"F" designates the leg through which the leads are brought out.

An "X" anywhere in the Identification Code indicates that the parameter was not applicable.

xxx/yy in the "Reading No." column indicates the Channel No. (xxx) on which the parameter was recorded, and the rated capacity (yy) of the transducer used.

The "N/U" Code in the "Reading No." Column indicates channels that were not used.

"LeRC Sys" - recorded on separate system, therefore no channel number.

Table 4. - Continued.

(b) Instrumentation list.

Measure- ment Number	Identification	31	33	34	35	37	38	51	57	61	63	64	65	69	70	73	78	84	88	89	91	92	93	96	97
1-3	0.295 - 0	121/25																							
2-5	14.492 - 0.111	N/U																							
3-5	14.493 - 271.95	90-3																							
4-5	14.473 - 180.5	90-3																							
5-5	14.4 - 90	90-3																							
6-5	30.095 - 359.94	90-3																							
7-5	35.085 - 359.94	90-3																							
8-5	35.085 - 359.94	90-3																							
9-5	35.071 - 179.28	90-3																							
10-5	35.075 - 599.21	90-3																							
11-5	35.500 - 359.21	90-3																							
12-5	35.077 - 359.21	90-3																							
13-5	35.497 - 359.21	90-3																							
14-5	35.497 - 359.21	90-3																							
15-5	35.496 - 179.27	90-3																							
16-5	35.482 - 599.21	90-3																							
17-5	35.482 - 359.21	90-3																							
18-5	35.482 - 359.21	90-3																							
19-5	35.482 - 359.21	90-3																							
20-5	35.017 - 359.21	90-3																							
21-5	35.017 - 359.21	90-3																							
22-5	35.017 - 359.21	90-3																							
23-5	35.017 - 359.21	90-3																							
24-5	35.017 - 359.21	90-3																							
25-5	35.017 - 359.21	90-3																							
26-5	35.017 - 359.21	90-3																							
27-5	35.017 - 359.21	90-3																							
28-5	35.017 - 359.21	90-3																							
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40-5	35.017 - 359.21	90-3																							
41-5	35.017 - 359.21	90-3																							
42-5	35.017 - 359.21	90-3																							
43-5	35.017 - 359.21	90-3																							
44-5	35.017 - 359.21	90-3																							
45-5	35.017 - 359.21	90-3																							
46-5	35.017 - 359.21	90-3																							
47-5	35.017 - 359.21	90-3																							
48-5	35.017 - 359.21	90-3																							
49-5	35.017 - 359.21	90-3																							
50-5	35.017 - 359.21	90-3																							
51-5	35.017 - 359.21	90-3																							
52-5	35.017 - 359.21	90-3																							
53-5	35.017 - 359.21	90-3																							
77-T	Load Cell	277/3050 lb = 32aw																							

\*Continues to end



Table 4. - Continued.

(b) Continued

Measure- ment Number	Identification	READING NUMBER															
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78
1-1	1-P - 54,519 - 355°49' - 90-3	153/20															
2-1	1-P - 54,519 - 355°49' - 90-3	N/U															
3-1	1-P - 54,512 - 175°11' - 90-3	186/50															
4-1	1-P - 54,514 - 90°0' - 90-4	N/U															
5-1	1-P - 56,004 - 0°48' - 90-4	271/75															
6-1	1-P - 56,004 - 32°30' - 90	Not Routed															
7-1	1-P - 56,004 - 175°30' - 90	Not Routed															
8-1	1-P - 56,004 - 175°30' - 90	Not Routed															
9-1	1-P - 56,799 - 355°45' - 90-4	270/75															
10-1	1-T - 54,000 - 0	Not Routed															
11-1	1-T - 55,250 - 0	Not Routed															
12-1	1-T - 53,979 - 240°0' - CA-3	308/50															
13-1	1-T - 53,979 - 240°0' - CA-3	290/50															
14-1	1-T - 50,019 - 120°0' - CA-4	290/50															
15-1	1-T - 54,799 - 354°56' - CA-4	309/50															

\*Continues to end

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Measure- ment Number	Identification	READING NUMBER															
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78
1-10	1-P - 56,004 - 50°34' - 90-4	146/20															
2-10	1-P - 56,004 - 115°38' - 90-4	145/10															
3-10	1-P - 56,004 - 180°0' - 90-4	146/10															
4-10	1-P - 56,004 - 180°0' - 90-4	147/10															
5-10	1-P - 56,004 - 180°0' - 90-4	148/10															
6-10	1-P - 56,004 - 180°0' - 90-4	149/10															
7-10	1-P - 56,004 - 180°0' - 90-4	150/10															
8-10	1-P - 56,004 - 180°0' - 90-4	151/10															
9-10	1-P - 56,004 - 180°0' - 90-4	152/10															
10-10	1-P - 56,004 - 180°0' - 90-4	153/10															
11-10	1-P - 56,004 - 180°0' - 90-4	154/10															
12-10	1-P - 56,004 - 180°0' - 90-4	155/10															
13-10	1-P - 56,004 - 180°0' - 90-4	156/10															
14-10	1-P - 56,004 - 180°0' - 90-4	157/10															
15-10	1-P - 56,004 - 180°0' - 90-4	158/10															

\*Continues to end

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Table 4. - Continued.

(b) Continued.

Measure- ment Number	Identification	31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	76	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	97			
1-00	CO-2 - 35.525 - 67° 3'	M/U											M/U	155/25	155/15																					
2-00	CO-2 - 35.514 - 172° 58'	30-4												156/15																						
3-00	CO-2 - 35.504 - 242° 58'	30-3												M/U																						
4-00	CO-2 - 35.494 - 242° 58'	30-3												157/25																						
5-00	CO-2 - 35.484 - 172° 51'	30-4												158/10																						
6-00	CO-2 - 35.474 - 172° 51'	30-4												159/15																						
7-00	CO-2 - 35.464 - 255° 31'	30-3												160/10																						
8-00	CO-2 - 35.454 - 255° 31'	30-3												161/15																						
9-00	CO-2 - 35.444 - 172° 51'	30-4												162/10																						
10-00	CO-2 - 35.434 - 172° 51'	30-4												163/15																						
11-00	CO-2 - 35.424 - 255° 31'	30-3												164/10																						
12-00	CO-2 - 35.414 - 255° 31'	30-3												165/15																						
13-00	CO-2 - 35.404 - 255° 31'	30-4												166/15																						
14-00	CO-2 - 35.394 - 172° 51'	30-4												167/10																						
15-00	CO-2 - 35.384 - 255° 31'	30-3												168/15																						
16-00	CO-2 - 35.374 - 255° 31'	30-3												169/15																						
17-00	CO-2 - 35.364 - 255° 31'	30-3												170/15																						
18-00	CO-2 - 35.354 - 210° 31'	75-3												171/10																						
19-00	CO-2 - 35.344 - 210° 31'	110-3												172/10																						
20-00	CO-2 - 35.334 - 210° 31'	110-3												173/15																						
21-00	CO-2 - 35.324 - 210° 31'	110-3												174/10																						
22-00	CO-2 - 35.314 - 210° 31'	110-3												175/15																						
23-00	CO-2 - 35.304 - 210° 31'	110-3												176/10																						
24-00	CO-2 - 35.294 - 210° 31'	110-3												177/15																						
25-00	CO-2 - 35.284 - 210° 31'	110-3												178/10																						
26-00	CO-2 - 35.274 - 210° 31'	110-3												179/15																						
27-00	CO-2 - 35.264 - 210° 31'	110-3												180/10																						
28-00	CO-2 - 35.254 - 210° 31'	110-3												181/15																						
29-00	CO-2 - 35.244 - 210° 31'	110-3												182/10																						
30-00	CO-2 - 35.234 - 210° 31'	110-3												183/15																						
31-00	CO-2 - 35.224 - 210° 31'	110-3												184/10																						
32-00	CO-2 - 35.214 - 210° 31'	110-3												185/15																						
33-00	CO-2 - 35.204 - 210° 31'	110-3												186/10																						
34-00	CO-2 - 35.194 - 210° 31'	110-3												187/15																						
35-00	CO-2 - 35.184 - 210° 31'	110-3												188/10																						
36-00	CO-2 - 35.174 - 210° 31'	110-3												189/15																						
37-00	CO-2 - 35.164 - 210° 31'	110-3												190/10																						
38-00	CO-2 - 35.154 - 210° 31'	110-3												191/15																						
39-00	CO-2 - 35.144 - 210° 31'	110-3												192/10																						
40-00	CO-2 - 35.134 - 210° 31'	110-3												193/15																						
41-00	CO-2 - 35.124 - 210° 31'	110-3												194/10																						
42-00	CO-2 - 35.114 - 210° 31'	110-3												195/15																						
43-00	CO-2 - 35.104 - 210° 31'	110-3												196/10																						
44-00	CO-2 - 35.094 - 210° 31'	110-3												197/15																						
45-00	CO-2 - 35.084 - 210° 31'	110-3												198/10																						
46-00	CO-2 - 35.074 - 210° 31'	110-3												199/15																						
47-00	CO-2 - 35.064 - 210° 31'	110-3												200/10																						
48-00	CO-2 - 35.054 - 210° 31'	110-3												201/15																						
49-00	CO-2 - 35.044 - 210° 31'	110-3												202/10																						
50-00	CO-2 - 35.034 - 210° 31'	110-3												203/15																						
51-00	CO-2 - 35.024 - 210° 31'	110-3												204/10																						
52-00	CO-2 - 35.014 - 210° 31'	110-3												205/15																						
53-00	CO-2 - 35.004 - 210° 31'	110-3												206/10																						
54-00	CO-2 - 34.994 - 210° 31'	110-3												207/15																						
55-00	CO-2 - 34.984 - 210° 31'	110-3												208/10																						
56-00	CO-2 - 34.974 - 210° 31'	110-3												209/15																						
57-00	CO-2 - 34.964 - 210° 31'	110-3												210/10																						
58-00	CO-2 - 34.954 - 210° 31'	110-3												211/15																						
59-00	CO-2 - 34.944 - 210° 31'	110-3												212/10																						
60-00	CO-2 - 34.934 - 210° 31'	110-3												213/15																						
61-00	CO-2 - 34.924 - 210° 31'	110-3												214/10																						

Continues to end

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Table 4. - Continued.

(b) Continued.

Measure- ment Number	Identification	31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78	84	88	89	91	92	93	96	97
1-0	O-P - 41.06 - 090°	201/75															201/50								
2-0	O-P - 41.06 - 1800°	272/75															272/50						272/75		
3-0	O-P - 41.06 - 2100°	N/U															277/50								
4-0	O-P - 41.06 - 3300°	N/U						200/75									288/50								
5-0	O-P - 43.786 - 090°										202/100						200/50								
6-0	O-P - 43.786 - 1800°										203/100						207/50								
7-0	O-P - 43.786 - 2100°																203/50								
8-0	O-P - 43.786 - 3300°																204/50								
9-0	O-P - 45.222 - 100°																206/50								
10-0	O-P - 47.016 - 100°																206/50								
11-0	O-P - 49.005 - 100°																206/50								
12-0	O-P - 49.020 - 900°																206/50								
13-0	O-P - 49.003 - 900°																206/50								
14-0	O-P - 49.005 - 2700°																207/50								
15-0	O-P - 49.506 - 0°																207/50								
16-0	O-P - 50.411 - 0°																207/50								
17-0	O-P - 50.411 - 180°																207/50								
18-0	O-P - 50.411 - 270°																207/50								
19-0	O-P - 50.505 - 1°																198/50								
20-0	O-P - 52.506 - 0°																208/50								
21-0	O-P - 53.006 - 1°																221/50								
22-0	O-P - 53.006 - 90°																209/50								
23-0	O-P - 53.006 - 180°																210/50								
24-0	O-P - 53.993 - 270°																211/50								
25-0	O-P - 54.510 - 0°																212/50								
26-0	O-P - 54.510 - 0°																214/50								
27-0	O-P - 56.496 - 0°																215/50								
28-0	O-P - 57.451 - 0°																216/50								
29-0	O-P - 59.472 - 0°																217/50								
30-0	O-P - 60.476 - 0°																218/50								
31-0	O-P - 61.870 - 0°																220/75								
32-0	O-P - 61.881 - 110°																220/75								
33-0	O-P - 61.881 - 180°																220/75								
34-0	O-P - 61.874 - 230°																220/75								
35-0	O-P - 62.976 - 0°																220/75								
36-0	O-P - 63.974 - 0°																222/75								
37-0	O-P - 64.972 - 1°																222/75								
38-0	O-P - 64.972 - 1°																222/75								
39-0	O-P - 64.972 - 1°																222/75								
40-0	O-P - 64.972 - 1°																222/75								
41-0	O-P - 64.972 - 1°																222/75								
42-0	O-P - 64.972 - 1°																222/75								
43-0	O-P - 64.972 - 1°																222/75								
44-0	O-P - 64.972 - 1°																222/75								
45-0	O-P - 64.972 - 1°																222/75								
46-0	O-P - 64.972 - 1°																222/75								
47-0	O-P - 64.972 - 1°																222/75								
48-0	O-P - 64.972 - 1°																222/75								
49-0	O-P - 64.972 - 1°																222/75								
50-0	O-P - 64.972 - 1°																222/75								
51-0	O-P - 64.972 - 1°																222/75								
52-0	O-P - 64.972 - 1°																222/75								

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Table 4. - Continued.

(b) Continued.

Measure- ment Number	Identification	READING NUMBER															
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78
43-0	Q-T - 50.010 - 2100	Not Routed															
44-0	Q-T - 51.505 - 3100	CA-3															
45-0	Q-T - 52.010 - 00	CA-3															
46-0	Q-T - 52.996 - 3100	CA-3															
47-0	Q-T - 54.0 - 00	CA-3															
48-0	Q-T - 55.0 - 00	CA-3															
49-0	Q-T - 56.00 - 00	CA-3															
50-0	Q-T - 56.00 - 1200	CA-3															
51-0	Q-T - 56.00 - 2100	CA-3															
52-0	Q-T - 57.010 - 00	CA-3															
53-0	Q-T - 57.970 - 00	CA-3															
54-0	Q-T - 58.996 - 00	CA-3															
55-0	Q-T - 59.970 - 00	CA-3															
56-0	Q-T - 60.970 - 00	CA-3															
57-0	Q-T - 62.470 - 00	CA-3															
58-0	Q-T - 62.470 - 1200	CA-3															
59-0	Q-T - 62.470 - 2100	CA-3															
60-0	Q-T - 63.970 - 00	CA-3															
61-0	Q-T - 64.475 - 00	CA-3															
62-0	Q-T - 65.224 - 3100	CA-3															
63-0	Q-T - 66.0 - 00	CA-3															

\*Continuous to end

Measure- ment Number	Identification	READING NUMBER															
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78
1-N	M-P - 64.635 - 290551	80-3															
2-N	M-P - 67.305 - 2400	80-3															
3-N	M-P - 68.800 - 1100	80-3															
4-N	M-P - 69.605 - 150531	80-3															
5-N	M-P - 70.360 - 150531	80-3															
6-N	M-P - 71.225 - 290501	80-3															
7-N	M-P - 72.320 - 23551	80-3															
8-N	M-P - 73.030 - 170517	80-3															
9-N	M-P - 73.224 - 180511	80-3															
10-N	M-P - 73.330 - 237057	80-3															
11-N	M-P - 73.330 - 237057	80-3															
12-N	M-P - 73.330 - 237057	80-3															
13-N	M-P - 73.330 - 237057	80-3															
14-N	M-P - 73.330 - 237057	80-3															
15-N	M-P - 73.330 - 237057	80-3															

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Measure- ment Number	Identification	READING NUMBER															
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78
16-N	M-P - 70.321 - 180512	80-4															
17-N	M-P - 70.317 - 130581	80-4															
18-N	M-P - 71.040 - 130531	80-4															
19-N	M-P - 71.054 - 150510	80-4															
20-N	M-P - 71.053 - 155535	80-4															
21-N	M-P - 71.978 - 0011	80-4															
22-N	M-P - 71.985 - 180521	80-4															
23-N	M-P - 71.985 - 180521	80-4															
24-N	M-P - 71.985 - 180521	80-4															
25-N	M-P - 71.985 - 180521	80-4															
26-N	M-P - 71.985 - 180521	80-4															
27-N	M-P - 71.985 - 180521	80-4															
28-N	M-P - 71.985 - 180521	80-4															
29-N	M-P - 71.985 - 180521	80-4															
30-N	M-P - 71.985 - 180521	80-4															
31-N	M-P - 71.985 - 180521	80-4															
32-N	M-P - 71.985 - 180521	80-4															
33-N	M-P - 71.985 - 180521	80-4															
34-N	M-P - 71.985 - 180521	80-4															

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Table 4. - Continued.

(b) Continued.

Measure- ment Number	Identification	31	33	34	35	37	38	51	57	61	63	64	65	69	70	73	78	84	88	89	91	92	93	96	97
35-OC	OCB - P - 65, 34 - X - 180-X	251/10																							
1-F	S-P - 1A - 172 - X-3	M/U																							
2-F	S-P - 1A - 25 - X-3	246/200																							
3-F	S-P - 1C - 175 - X-3	M/U																							
4-F	S-P - 1C - 25 - X-3	M/U																							
5-F	S-P - 2C - 175 - X-4	M/U																							
6-F	S-P - 2C - 25 - X-4	M/U																							
7-F	1-P - 38 - 95 - X-4	M/U																							
8-F	1-P - 38 - 275 - X-4	M/U																							
9-F	0-P - 18 - 90 - X-4	240/200																							
10-F	0-P - 18 - 270 - X-3	241/200																							
11-F	0-P - 4 - 90 - X-4	Not Routed																							
12-F	0-P - 4 - 270 - X-4	Not Routed																							
13-F	0-P - 2A - 90 - X-4	Not Routed																							
14-F	0-P - 2A - 270 - X-3	M/U																							
15-F	0-P - 3A - 90 - X-4	M/U																							
16-F	0-P - 3A - 270 - X-3	M/U																							
17-F	S-T - 1A - 188 - CA-3	53/50																							
18-F	S-T - 1A - 30 - CA-3	54/50																							
19-F	S-T - 1C - 180 - CA-4	55/50																							
20-F	S-T - 1C - 30 - CA-4	56/50																							
21-F	S-T - 2C - 180 - CA-3	57/50																							
22-F	S-T - 2C - 30 - CA-3	58/50																							
23-F	1-T - 38 - 90 - CA-4	59/50																							
24-F	1-T - 38 - 270 - CA-4	60/50																							
25-F	0-T - 18 - 90 - CA-4	61/50																							
26-F	0-T - 18 - 270 - CA-3	62/50																							
27-F	0-T - 2A - 90 - CA-4	63/50																							
28-F	0-T - 2A - 270 - CA-3	64/50																							
29-F	0-T - 4 - 90 - CA-4	65/50																							
30-F	0-T - 4 - 270 - CA-3	66/50																							
31-F	0-T - 3A - 90 - CA-3	67/50																							
32-F	0-T - 3A - 270 - CA-3	68/50																							
33-F	S-P - 1CM O <sub>2</sub> - X - X-3	240/300																							
34-F	S-P - 1CM O <sub>2</sub>	Not Routed																							
35-F	0-P - 1CM O <sub>2</sub> - X - X-4	236/300																							
36-F	0-P - 1CM O <sub>2</sub>	Not Routed																							
37-F	S-P - 1CM H <sub>2</sub> - X - X-4	252/300																							
38-F	S-P - 1CM H <sub>2</sub>	Not Routed																							
39-F	0-P - 1CM H <sub>2</sub> - X - X-4	253/300																							
40-F	0-P - 1CM H <sub>2</sub>	Not Routed																							
41-F	S-P - H <sub>2</sub> O IN (TIP) - X - X-4																								
42-F	1-P - H <sub>2</sub> O IN (TIP) - X - X-4																								
43-F	ST-P - H <sub>2</sub> O IN (LE) - X - X-4																								
44-F	ST-P - H <sub>2</sub> O IN (SIDE) - X - X-4																								
45-F	0-P - H <sub>2</sub> O IN - X - X-3																								

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Table 4. - Continued.

(b) Continued.

Measure- ment Number	Identification	READING NUMBER																							
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78	84	88	89	91	92	93	96	97
46-F	OC-P - H <sub>2</sub> O IN (A) - X - X-4																								
47-F	OC-P - H <sub>2</sub> O IN (B) - X - X-4																								
48-F	OC-P - H <sub>2</sub> O IN (C) - X - X-4																								
49-F	OC-P - H <sub>2</sub> O IN (D) - X - X-4																								
50-F	S-P - H <sub>2</sub> O OUT (1P) - X - X-4																								
51-F	1-P - H <sub>2</sub> O OUT - X - X-3																								
52-F	ST-P - H <sub>2</sub> O OUT (LE) - X - X-3																								
53-F	ST-P - H <sub>2</sub> O OUT (S10E) - X - X-3																								
54-F	0-P - H <sub>2</sub> O OUT - X - X-3																								
55-F	OC-P - H <sub>2</sub> O OUT (A) - X - X-3																								
56-F	OC-P - H <sub>2</sub> O OUT (B) - X - X-3																								
57-F	OC-P - H <sub>2</sub> O OUT (C) - X - X-3																								
58-F	OC-P - H <sub>2</sub> O OUT (D) - X - X-3																								
59-F	S-Δ <sup>+</sup> - H <sub>2</sub> O OUT - X - X-4																								
59-F	S-Δ <sup>+</sup> - H <sub>2</sub> O IN - X - X-4																								
60-F	1-Δ <sup>+</sup> - H <sub>2</sub> O OUT - X - X-3																								
61-F	1-Δ <sup>+</sup> - H <sub>2</sub> O IN - X - X-4																								
61-F	ST-Δ <sup>+</sup> - H <sub>2</sub> O IN (LE) - X - X-3																								
62-F	ST-Δ <sup>+</sup> - H <sub>2</sub> O OUT (S10E) - X - X-3																								
62-F	ST-Δ <sup>+</sup> - H <sub>2</sub> O IN (S10E) - X - X-4																								
63-F	0-Δ <sup>+</sup> - H <sub>2</sub> O OUT - X - X-3																								
63-F	0-Δ <sup>+</sup> - H <sub>2</sub> O IN - X - X-3																								
64-F	MYD-P - IN - X - X-4																								
65-F	MYD-P - OUT - X - X-4																								
66-F	Δ <sup>+</sup> 18 - 40.6 - 3 - X-4																								
67-F	Δ <sup>+</sup> 18 - 35.75 - 356 - X-4																								
67-F	Δ <sup>+</sup> 18 - 40.6 - 181 - X-4																								
67-F	Δ <sup>+</sup> 18 - 35.75 - 176 - X-4																								
68-F	Δ <sup>+</sup> 20 - 55.6 - 357 - X-4																								
68-F	Δ <sup>+</sup> 20 - 40.5 - 5 - X-4																								
68-F	Δ <sup>+</sup> 20 - 55.6 - 177 - X-4																								
69-F	Δ <sup>+</sup> 18 - 66.2 - 356 - X-4																								
70-F	Δ <sup>+</sup> 18 - 55.6 - 355 - X-4																								
70-F	Δ <sup>+</sup> 18 - 55.6 - 176 - X-4																								
71-F	Δ <sup>+</sup> 18 - 66.19 - 176 - X-4																								
71-F	Δ <sup>+</sup> 18 - 55.6 - 175 - X-4																								
72-F	Δ <sup>+</sup> 18 - 71.36 - 356 - X-4																								
72-F	Δ <sup>+</sup> 18 - 66.68 - 356 - X-4																								
73-F	Δ <sup>+</sup> 18 - 71.36 - 176 - X-4																								
73-F	Δ <sup>+</sup> 18 - 66.68 - 176 - X-4																								

1-49211

Table 4. - Continued.

(b) Continued

Measure- ment Number	Identification	READING NUMBER																								
		31	33	34	36	37	38	51	57	61	63	64	65	69	70	73	78	84	88	89	91	92	93	96	97	
74-F	ΔTSJ - 40.0 - 4 - CuC-3	383/Δ5sm													361/5sm											
74-F	ΔTSK - 47.8 - 184 - CuC-3														363/5sm											
75-F	ΔTSJ - 40.0 - 184 - CuC-4	384/Δ5sm													354/5sm											
75-F	ΔTSK - 47.8 - 184 - CuC-4														355/5sm											
76-F	ΔTSM - 50.8 - 358 - CuC-3	385/Δ5sm													364/5sm											
76-F	ΔTSL - 48.58 - 357 - CuC-3														365/5sm											
77-F	ΔTSM - 50.8 - 178 - CuC-4	386/Δ5sm													366/5sm											
77-F	ΔTSL - 48.58 - 181 - CuC-4														367/5sm											
78-F	ΔTTP - 66.10 - 356 - CuC-3	387/Δ5sm													368/5sm											
78-F	ΔTTP - 66.10 - 356 - CuC-4														369/5sm											
79-F	ΔTTP - 66.10 - 176 - CuC-4	388/Δ5sm													364/5sm											
79-F	ΔTTP - 66.10 - 176 - CuC-4														365/5sm											
80-F	0-ΔT - H <sub>2</sub> O OUT - X - X-4	389/Δ5sm													362/5sm											
80-F	0-ΔT - H <sub>2</sub> O IN - X - X-4																									
81-F	0-P - H <sub>2</sub> O OUT - X - X-3																									
82-F	0-P - H <sub>2</sub> O IN - X - X-4	Visually Monitored																								
83-F	1-T - H <sub>2</sub> O - 52.8 - 27 - CA-3	390/5sm																								
84-F	1-T - H <sub>2</sub> O - 57.8 - 30 - CA-4	391/5sm													391/5sm											
85-F	PURGE CAVITY PA-1-X - X - X-3	254/25																								
86-F	PURGE CAVITY PA-2-X - X - X-3	255/25																								
87-F	PURGE CAVITY PB-1-X - X - X-3	256/25																								
88-F	PURGE CAVITY PB-2-X - X - X-3	257/25																								
89-F	INNER BODY CAV PRES - X-X-CA-	69/5																								
90-F	INNER BODY CAV TEMP - X-X-CA-	394/5sm																								
91-F	PURGE CAVITY TAI - X - X - CA-	394/5sm																								
92-F	PURGE CAVITY TAJ - X - X - CA-	395/5sm																								
93-F	PURGE CAVITY TBI - X - X - CA-	396/5sm																								
94-F	PURGE CAVITY TBI - X - X - CA-	397/5sm																								
95-F		N/A																								
96-F		N/A																								
97-F		N/A																								
98-F		N/A																								
99-F		N/A																								
100-F	PURGE CAVITY	70/50																								
101-F	PURGE CAVITY	71/50																								
102-F	PURGE CAVITY	72/50																								

\*Continuous to end

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Table 4. - Concluded.

(b) Concluded

Measurement Number	Identification			READING NUMBER	
				92	97
1	ICE	CE-PT - 66.74 - 0 - 00 - X	155/75	155/50	155/75
2		CE-PS - 67.04 - 0 - 13 - X	156/50	156/15	156/50
3		CE-PS - 67.04 - 0 - 109 - X	157/50	157/15	157/50
4		CE-PS - 67.04 - 0 - 198 - X	158/50	158/15	158/50
5		CE-PT - 66.74 - 110 - 00 - X	159/50	159/15	159/50
6		CE-PT - 66.74 - 110 - 00 - X	160/75	160/50	160/75
7		CE-PS - 67.04 - 110 - 18 - X	161/50	161/15	161/50
8		CE-PS - 67.04 - 110 - 108 - X	162/50	162/15	162/50
9		CE-PS - 67.04 - 110 - 198 - X	163/50	163/15	163/50
10		CE-PS - 67.04 - 110 - 288 - X	164/50	164/15	164/50
11		CE-PT - 66.74 - 180 - 00 - X	165/50	165/15	165/50
12		CE-PS - 67.04 - 180 - 91 - X	166/50	166/15	166/50
13		CE-PS - 67.04 - 180 - 181 - X	167/50	167/15	167/50
14		CE-PS - 67.04 - 180 - 271 - X	169/50	169/15	169/50
15		CE-PT - 66.74 - 280 - 00 - X	170/50	170/15	170/50
16		CE-PT - 66.74 - 280 - 355 - X	171/75	171/50	171/75
17		CE-PS - 67.04 - 280 - 85 - X	172/50	172/15	172/50
18		CE-PS - 67.04 - 280 - 175 - X	173/50	173/15	173/50
19		CE-PS - 67.04 - 280 - 265 - X	174/50	174/15	174/50
20		CE-PT - 66.74 - 330 - 00 - X	177/50	177/15	177/50
21		CE-PS - 67.04 - 330 - 3 - X	178/50	178/15	178/50
22		CE-PS - 67.04 - 330 - 93 - X	179/50	179/15	179/50
23		CE-PS - 67.04 - 330 - 183 - X	233/50	233/15	233/50
24		CE-PS - 67.04 - 330 - 183 - X	234/50	234/15	234/50
25		CE-PS - 67.04 - 330 - 273 - X	235/50	235/15	235/50
26		CE-G-GS - 30 - P/R - X	LeRC sys	LeRC	LeRC
27		CE-G-TT - 30 - C/A - X	LeRC sys	124/20	124/20
28		CE-G-RT - 30 - X - X	LeRC sys	142/20	142/20
29		CE-G-PT - 30 - X - X	237/75	237/50	237/75
30		CE-G-PS - 30 - X - X	238/60	238/30	238/60
31		CE-G-GS - 70 - P/R - X	LeRC sys	81/20	81/20
32		CE-G-TT - 70 - CA - X	LeRC sys	231/20	231/20
33		CE-G-RT - 70 - X - X	LeRC sys	239/50	239/75
34		CE-G-PT - 70 - X - X	219/75	242/30	242/60
35		CE-G-PS - 70 - X - X	242/60	LeRC	LeRC
36		CE-G-GS - 170 - X - X	LeRC sys	82/20	82/20
37		CE-G-TT - 170 - X - X	LeRC sys	244/20	244/10
38		CE-G-RT - 170 - X - X	LeRC sys	243/75	243/75
39		CE-G-PT - 170 - X - X	245/60	245/30	245/60
40		CE-G-PS - 170 - X - X	LeRC sys	345/20	LeRC
41		CE-G-GS - 260 - X - X	LeRC sys	246/50	246/75
42		CE-G-TT - 260 - X - X	LeRC sys	247/30	247/60
43		CE-G-RT - 260 - X - X	246/75	LeRC	LeRC
44		CE-G-PT - 260 - X - X	247/60	346/20	346/75
45		CE-G-PS - 260 - X - X	LeRC sys	140/20	140/20
46		CE-G-GS - 350 - X - X	LeRC sys	249/75	249/75
47		CE-G-TT - 350 - X - X	LeRC sys	250/50	250/50
48		CE-G-RT - 350 - X - X	LeRC sys		
49		CE-G-PT - 350 - X - X	LeRC sys		
50		CE-G-PS - 350 - X - X	LeRC sys		



Table 5. - Summary of HRE/AIM test points used for analyses.

## (a) Mach 6 component integration results:

Page No.	* Reading Number	Time	M <sub>0</sub>	P <sub>T0</sub> psia	T <sub>T0</sub> °R	X <sub>CL</sub> in.	α	Inj.1/φ <sub>1</sub>	Inj.2/φ <sub>2</sub>	Inj.3/φ <sub>3</sub>	φ <sub>T</sub>	Ignitors 1, 2, 3	Purpose & Remarks
—	33**	126.95	6.0	750	3000	35.2	0°	0	0	0	0	No	No fuel injection
—		161.15						1A,1B/.24	0	0	0.24	1,2	1st stage only
—		168.0						1A,1B/.3	0	0	0.30		1st stage only
—		174.65						1A,1B/.36	0	0	0.36		Max. φ, engine unstart
57	34	98.15	6.0	750	3000	35.2	0°	0	0	0	0	1,2	
65		104.45						1A,1B/.20	0	0	0.20		1st stage only
73		148.55						1A,1B/.23	2A/.58	0	0.81		1st and 2nd stages
81		181.85						1A,1B/.21	2A/.56	3A/.39	1.16		Max. φ, 3 stages
89		196.25		940				1A,1B/.15	2A/.44	3A/.32	0.91		Max. φ, 3 stages
—	36 a	119.18	6.0	750	3000	35.2	0°	0	0	0	0	No	Auto ignition
—	a	124.58						1A,1B/.26	0	0	0.26		
97		132.68						1A,1B/.25	2A,2C/.34	0	0.59		
106		144.38						1A,1B/.24	2A,2C/.49	0	0.73		
115		158.78						1A,1B/.23	2A,2C/.69	0	0.92		
124		173.18						1A,1B/.22	2A,2C/.75	0	0.97		
133	38	96.24	6.0	750	3000	35.2	0°	0	0	0	0	No	
141		107.05						1A,1B/.33	0	0	0.33		1st stage only
150		113.35						0	2C/.38	0	0.38		2nd stage only
158		116.95						1A,1B/.18	2C/.67		0.85		transient data
167	52	165.93	6.0	750	3000	35.2	0°	0	0	0	0	No	φ1A,1B and φ4,2C
175		172.23						1A,1B/.24	4,2C/.26	0	0.50		
183		180.33						1A,1B/.20	4,2C/.41	0	0.61		
191		189.33						1A,1B/.20	4,2C/.53	0	0.73		
199	54	156.46	6.0	750	3000	35.2	0°	0	0	0	0	No	Constant φ1A,1B, φ2A,2C
207		185.26						1A,1B/.21	2A,2C/.64	0	0.85		ramped up 3 times
215		200.56						1A,1B/.23	2A,2C/.43	0	0.66		
223		222.16						1A,1B/.24	2A,2C/.25	0	0.49		
231		235.66						1A,1B/.24	2A,2C/.52	0	0.76		
239		253.66						1A,1B/.18	2A,2C/.60	0	0.78	1,2	
247		280.66						1A,1B/.20	2A,2C/.61	0	0.81	No	
255	57	195.11	6.0	750	3000	35.2	0°	0	0	0	0	No	Optimized performance
263		207.71						1A,1B/.21	2A,2C/.73	0	0.94		
271		234.71						1A,1B/.32	2A,2C/.60	0	0.92		
279		265.31						1A,1B/.21	2A,2C/.36	0	0.57		
287		287.81						1A,1B/.20	2A,2C/.54	0	0.74		
295	60	155.69	6.0	750	3000	35.2	0°	0	0	0	0	No	Variation of fuel schedule
303		178.19						1A,1B/.21	2A,2C/.64	0	0.85		
311		186.29						1A,1B/.22	2A,2C/.65	0	0.87		
319		202.49						1A,1B/.21	2A,2C/.65	0	0.86		
327		223.19						1A/.21	2A,2C/.66	0	0.87		
335		230.39						1A,1B/.21	2A,2C/.67	0	0.88		
343		241.19						1B/.19	2A,2C/.68	0	0.87		
351		249.29						1B/.24	2A,2C/.68	0	0.92		
359		258.29						0	2A,2C/.76	0	0.76		
367		264.59						0	2A,2C/.80	0	0.80		

\*Herein

\*\* Because of insufficient valid engine surface pressure measurements, performance results were not obtained.

a Listings not available.

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Table 5. - Continued.

(b) Mach 6 engine performance results.

Page No.	* Reading Number	Time	M <sub>0</sub>	P <sub>T0</sub> psia	P <sub>T0</sub> OR	X <sub>CL</sub> in.	$\alpha$	Inj. 1/ $\phi_1$	Inj. 2/ $\phi_2$	Inj. 3/ $\phi_3$	$\phi_T$	Ignitors 1, 2, 3	Purpose & Remarks
55	61	178.86	6.0	750	3000	36.7	0°	0	0	0	0	No	Effect of spike position
63		198.66						1A,1B/.13	2A,2C/.36	0	0.49		
72		205.86						1A,1B/.15	2A,2C/.49	0	0.64		
81		212.16						1A,1B/.15	2A,2C/.61	0	0.76		
90		222.06						1A,1B/.14	2A,2C/.73	0	0.87		
99		231.06				37.5	0°	0	0	0	0	No	Effect of spike position
108		243.66						1A,1B/.30	0	0	0.30		
117		246.36						1A,1B/.30	2A,2C/.47	0	0.77		
126		251.76						1A,1B/.29	2A,2C/.65	0	0.94		
135		262.56						1A,1B/.27	2A,2C/.96	0	1.13		
144	↓	273.36	↓	↓	↓	↓	↓	1A,1B/.26	2A,2C/1.15	0	1.41	↓	High test cell and AIM nozz. pressures
153	63	186.15	6.0	930	3000	35.2	0°	0	0	0		No	Effect of altitude
161		192.45						1A,1B/.24	2A,2C/.56	0	0.80		
169		216.75		↓				1A,1B/.24	2A,2C/.76	0	1.00		
177		249.15		470				0	0	0	0		
185	↓	275.25	↓	470	↓	↓	↓	1A,1B/.26	2A,2C/.73	0	0.99	↓	
193	64	156.11	6.0	750	3000	35.2	0°	0	0	0	0	No	Subsonic-supersonic transition
201		167.81						1B/.24	2A,2C/.77	0	1.01		
209		202.01						0	0	3A,3B/.85	0.85		
217		239.81						1B/.23	2A,2C/1.11	0	1.34		
225		261.41						1B/.24	0	3A,3B/.8	1.04		
233	↓	293.81	↓	↓	↓	↓	↓	1B/.26	2A,2C/.8	0	1.06	↓	
241	65	164.03	6.0	750	3000	35.2	0°	0	0	0	0	No	Supersonic combustion with instrumentation rig, gas sampling
249		174.83						1A,1B/.23	0	0	0.23		
257		180.23						1A,1B/.24	2A,2C/.34	0	0.58		
265		196.43						1A,1B/.24	2A,2C/.59	0	0.83		
273		201.83						1A,1B/.24	2A,2C/.80	0	1.04		
281		218.03						1A,1B/.27	2A,2C/.76	0	1.03		
282	↓	235.13	↓	↓	↓	↓	↓	1A,1B/.25	2A,2C/.79	0	1.04	↓	
297	69	177.00	6.0	750	3000	35.2	0°	0	0	0	0	No	Supersonic combustion with instrumentation rig, gas sampling
305		198.60						1A,1B/.22	0	0	0.22		
313		212.10						1A,1B/.23	2A,2C/.48	0	0.48		
321		226.50						1A,1B/.23	2A,2C/.59	0	0.82		
329		256.20						1A,1B/.22	2A,2C/.69	0	0.91		
337	↓	265.20	↓	↓	↓	↓	↓	1A,1B/.23	2A,2C/.79	0	1.02	↓	
345	71	160.54	6.0	750	3000	35.2	3°	0	0	0	0	No	Angle of attack perform- ance
353		171.39						1A,1B/.22	0	0	0.22		
361		174.94						1A,1B/.22	2A,2C/.31	0	0.53		
369		193.84						1A,1B/.24	2A,2C/.59	0	0.83		
377		207.34						1A,1B/.24	2A,2C/.81	0	1.05		
385		248.74						0	2A,2C/1.33	0	1.33		
393		266.74						0	2A,2C/.87	0	0.87		
401		270.34						0	2A,2C/.87	0	0.87		
409		284.74						0	2A,2C/.66	0	0.66		
417	↓	285.64	↓	↓	↓	↓	↓	0	2A,2C/.66	0	0.66	↓	

\*Reference 10

Table 5. - Continued.

(c) Mach 7 component integration and engine performance results:

Page* No.	Reading Number	Time	M <sub>0</sub>	P <sub>T0</sub> psia	P <sub>T0</sub> °R	X <sub>CL</sub> in.	α	Inj.1/φ <sub>1</sub>	Inj.2/φ <sub>2</sub>	Inj.3/φ <sub>3</sub>	φ <sub>T</sub>	Ignitors 1, 2, 3	Purpose & Remarks
54	88	236.40	7.25	1000	3160	36.6	0°	0	0	0	0	2	Exploratory run
62		245.40			3170			1A,1B/.30	0	0	0.30		
70		261.60			3250			1A,1B/.42	0	0	0.42		
78		269.70			3280			1A,1B/.55	0	0	0.55		
86		270.60			3270			1A,1B/.57	0	0	0.57		
94		271.50			3270			1A,1B/.58	0	0	0.58		
102		278.70			3270			1A,4/.16	2A,2C/.70	0	0.86		
111		285.90			3250			1A,4/.31	2A,2C/.60	0	0.91		
120		294.00			3200			1A,4/.28	2A,2C/.57	0	0.85		
129		299.40			3150			1A,4/.45	2A,2C/.46	0	0.91		
138	↓	305.70	↓	↓	3090	↓		1A,4/.49	2A,2C/.41	0	0.90	↓	↓
147	89	250.77	7.4	1000	1790	36.6	0°	0	0	0	0	No	Effect of low T <sub>0</sub>
155		272.37	7.25		3180			1A,1B/.32	2A,2C/.47	0	0.79	2	
164		283.17			3270			1A,1B/.34	2A,2C/.55	0	0.89		
173		290.37			3270			0	2A,2C/.75	0	0.75		
181		294.87			3310			0	2A,2C/.92	0	0.92		
189		304.77			3290			0	2A,2C/.59	0	0.59		
197		310.17	↓		3060			1A,1B/.32	2A,2C/.57	0	0.89		
206,232	**	316.47	7.30		2720			1A,1B/.29	2A,2C/.54	0	0.83		
215,241	**	327.27	7.34		2410			1A,1B/.28	2A,2C/.54	0	0.82		
224	↓	352.47	7.25	↓	3300	↓		1A,1B/.36	2A,2C/.57	0	0.93	↓	↓
249	90	197.22	7.25	1000	3000	36.6	0°	0	0	0	0	No	Optimization
257		206.22						1A,1B/.48	0	0	0.48	2	
265		212.52						1A,1B/.49	4/.05	0	0.54		
273		217.02						1A,1B/.48	1C,4/.34	0	0.82		
281		230.52						1A,1B/.26	1C,4/.51	0	0.77		
289		235.02						1A,1B/.79	1C,4/.19	0	1.98		Inlet unstarted
297		246.72						1A/.51	0	0	0.51		
305	↓	247.62	↓	↓	↓	↓		1A/.55	0	0	0.55	↓	↓
313	91	175.65	7.25	1000	3100	36.6	3°	1A,1B/.39	0	0	0.39	2	Angle of attack
321		180.15						1A,1B/.47	0	0	0.47	2	
329		186.45						0	0	0	0	No	
337		190.05						1A,1B/.51	4/.13	0	0.64	2	
345		203.55						1A,1B/.52	0	0	0.52		
353		216.15						1B/.27	4,2C/.34	0	0.61		
361		224.25						1B/.28	4,2C/.50	0	0.78		
369		226.95						1B/.28	4,2C/.45	0	0.73		
377		229.65						1B/.33	4,2C/.39	0	0.72		
385	↓	235.95	↓	↓	↓	↓		1B/.29	2C/.41	0	0.70	↓	↓
393	92	186.87	7.38	1000	2050	36.6	0°	0	0	0	0	No	Supersonic combustion
401		205.77	7.29		2850			1A,1B/.48	4,2C/.34	0	0.72	2	with instrumentation rig, gas sampling and O <sub>2</sub> content effect
409		227.37						1A,1B/.50	4,2C/.43	0	0.93		
417		248.07	↓		↓			1B/.33	4,2C/.58	0	0.91		
425		290.37	7.25		3000			1A,1B/.47	4,2C/.55	0	1.12		
433	↓	312.87	7.25	↓	3000	↓		1A,1B/.36	4,2C/.49	0	0.85	↓	↓

\*Reference 11

\*\* Recomputations were made with surface pressure substitutions

Table 5. - Continued.

(d) Mach 5 component integration and engine performance results:

Page *	Reading	Time	M <sub>0</sub>	P <sub>T0</sub> psia	P <sub>T0</sub> psia	X <sub>CL</sub> in.	α	Inj.1/φ <sub>1</sub>	Inj.2/φ <sub>2</sub>	Inj.3/φ <sub>3</sub>	φ <sub>T</sub>	Ignitors 1, 2, 3	Purpose & Remarks
54	93	134.03	5.1	420	2100	35.2	0°	0	0	0	0	No	No fuel injection
62		142.13						0	2A/.29	0	0.29	2	2nd stage only
70		150.23						0	2A/.31	3A,3B/.25	0.56		Subsonic combustion
78		158.33						0	0	3A,3B/.60	0.60		and O <sub>2</sub> content effect
86		162.83						0	0	3A,3B/.71	0.71		
94		174.53						0	0	3A,3B/.49	0.49		
102		182.63						0	0	3A,3B/.35	0.35		
110	94	134.14	5.1	420	2230	35.2	0°	0	0	0	0	No	Subsonic combustion
118		140.44						0	2A/.49	0	0.49	2	
126		150.34						0	2A/.49	3A,3B/.47	0.96		
134		157.54						0	0	3A,3B/1.03	1.03		
142		163.84						0	0	3A,3B/1.19	1.19		
150		180.04						0	0	3A,3B/.59	0.59		
158		214.24		300	2940			0	2A/.53	0	0.53		Effect of T <sub>0</sub>
166		215.14						0	2A/.53	0	0.53		High test cell and AIM nozz. pressures
174		218.74						0	2A/.54	3A,3B/.5	1.04		
183		231.34						1A,1B/.15	0	0	0.15		
191		233.14						1A,1B/.25	0	0	0.25		
199		234.04						1A,1B/.27	0	0	0.27		
207	95	129.55	5.2	300	2430	35.2	0°	0	0	0	0	No	Supersonic combustion
215		140.35	5.1		3080			1A,1B/.16	0	0	0.16	2	
223		160.15			2940			1A,1B/.18	2A,2C/.68	0	0.86		
231		169.15						1A,1B/.19	2A,2C/.83	0	1.02		
239		189.85						0	2A,2C/.99	0	0.99		
247		196.15						0	2A,2C/.86	0	0.86		
255		204.25						0	2A,2C/.71	0	0.71		
263		211.45						0	2A,2C/.58	0	0.58		
271		217.75						0	2A,2C/.70	0	0.70		
279		228.55						1A,1B/.22	2A,2C/.63	0	0.85		
287		241.15						0	0	0	0	No	
295		252.85		320	2800			1A,1B/.18	2A,2C/.70	0	0.88	2	
303		289.75		310	2890			0	2A,2C/.86	0	0.86		AIM nozz. press. high
311		310.45		420	2230			0	2A,2C/.66	0	0.66		Effect of T <sub>0</sub>
319		317.65		420	2230			0	2A,2C/.51	0	0.51		
327	96	134.44	5.1	420	2230	35.2	3°	0	0	0	0	No	Angle of attack perform-
336		141.64						0	2A/.38	0	0.38	2	ance
344		150.64						0	2A/.45	3A,3B/.38	0.83		
352		165.94						0	0	3A,3B/.87	0.87		
360		172.24						0	0	3A,3B/.59	0.59		
368		180.34						0	0	3A,3B/.43	0.43		
376		244.24		300	2925			0	0	0	0	No	
384		264.04		420	2230			1A,1B/.10	0	0	0.10	2	Fuel flow meas. malfunction; 1A flow only indicated
392		274.84						1A,1B/.21	0	0	0.21	2	
400		275.74						1A,1B/.20	0	0	0.20	2	
408		294.64						0	0	0	0	No	
417		313.54						0	0	3A,3B/.77	0.77	2	High test cell and AIM nozz. pressures

\*Reference 12

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Table 5. - Concluded.

(d) Concluded.

* Page No.	Reading Number	Time	M <sub>0</sub>	P <sub>T<sub>0</sub></sub> psia	P <sub>T<sub>0</sub></sub> O <sub>R</sub>	X <sub>CL</sub> in.	α	Inj.1/φ <sub>1</sub>	Inj.2/φ <sub>2</sub>	Inj.3/φ <sub>3</sub>	φ <sub>T</sub>	Ignitors 1, 2, 3	Purpose & Remarks
425	97	135.71	5.1	210	2100	35.2	0°	0	0	0	0	No	Subsonic combustion with instrumentation rig and gas sampling probes
433		156.41			2200			0	2A/.51	3A,3B/.49	0.90	2	
442		160.91						0	2A/.32	3A,3B/.24	0.56		
451		182.51						0	0	3A,3B/.50	0.50		
459		201.41						0	0	3A,3B/.67	0.67		
467		224.81						0	0	3A,3B/.86	0.86		
476		252.71		420				0	2A/.50	3A,3B/.43	0.93		
485		271.61						0	2A/.43	3A,3B/.34	0.77		
494		295.91						0	0	3A,3B/.74	0.74		
502		317.51						0	0	3A,3B/.90	0.90		
510		322.01						0	0	3A,3B/1.07	1.07		High test cell and AIM nozz. pressures
518		325.61						0	0	3A,3B/1.08	1.08		

\*Reference 12

Table 6. - Instrumentation code-outs for HRE/AIM performance computations.

```

C033 0000000 PROCDEF C033
C033 0000100 KDOSEL 60, 65, 67, 83, 84, 85, 86, 87, 88, 91, 92, 123, 124, 144, 154, 156, 158, 160, 162, 164
C033 0000200 KDOSEL 165, 166, 168, 171, 172, 174, 175, 176, 180, 181, 182, 183, 186, 191, 206
C033 0000300 KDOSEL 208, 212, 226, 228, 230, 231, 236, 239, 240, 241, 244, 248, 249, 290, 292
C033 0000400 KDOSEL 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319
C033 0000500 KDOSEL 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334
C033 0000600 KDOSEL 335, 336, 337, 338
C033 0000700 KDOSEL 399
C033 0000800 QUALIFY AIMLETT
C033 0000900 AT 3(2);SET VAL(11, INITRO)=-.73448, VAL(11, IOXY)=-.26552; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C033 0001000 QUALIFY STAPRS
C033 0001100 AT 320(2); DISPLAY 'INPUT PSI(1,1), THEN TYPE GO'
C034 0000000 PROCDEF C034
C034 0000100 KDOSEL 60, 65, 67, 84, 85, 86, 87, 88, 92, 123, 124, 144, 154, 156, 158, 160, 162, 164
C034 0000200 KDOSEL 166, 168, 171, 172, 174, 176, 180, 181, 182, 183, 186, 191, 195, 199, 201
C034 0000300 KDOSEL 206, 208, 212, 226, 228, 230, 231, 236, 240, 241, 244, 248, 249, 252, 290, 292
C034 0000400 KDOSEL 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319
C034 0000500 KDOSEL 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 334, 335
C034 0000600 KDOSEL 336, 337, 338
C034 0000700 KDOSEL 399
C034 0000800 QUALIFY AIMLETT
C034 0000900 AT 3(2);SET VAL(11, INITRO)=-.73448, VAL(11, IOXY)=-.26552; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C036 0000000 PROCDEF C036
C036 0000100 KDOSEL 60, 65, 66, 67, 123, 124, 144, 154, 156, 158, 160, 162, 164, 166, 168, 171, 172, 174, 181
C036 0000200 KDOSEL 182, 186, 191, 195, 199, 206, 208, 218, 228, 230, 231, 236, 240, 241, 244
C036 0000300 KDOSEL 248, 249, 252, 289, 290, 292, 294, 305, 310, 312, 313, 314, 315, 320
C036 0000400 KDOSEL 399
C036 0000500 QUALIFY AIMLETT
C036 0000600 AT 3(2);SET VAL(11, INITRO)=-.73448, VAL(11, IOXY)=-.26552; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C038 0000000 PROCDEF C038
C038 0000100 KDOSEL 60, 65, 66, 67, 123, 124, 144, 154, 164, 174, 181, 182, 186, 191, 195, 199, 201, 206, 228
C038 0000200 KDOSEL 230, 231, 236, 240, 241, 244, 248, 249, 252, 290, 292, 294, 305, 310, 312, 313
C038 0000300 KDOSEL 314, 315, 319, 320
C038 0000400 KDOSEL 399
C038 0000500 QUALIFY AIMLETT
C038 0000600 AT 3(2);SET VAL(11, INITRO)=-.73448, VAL(11, IOXY)=-.26552; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C038 0000700 QUALIFY STAPRS
C038 0000800 AT 320(2); DISPLAY 'INPUT PSI(1,1), THEN TYPE GO'
C052 0000000 PROCDEF C052
C052 0000100 KDOSEL 65, 66, 67, 124, 137, 139, 141, 154, 165, 168, 178, 181, 182, 195, 199, 200, 201, 206, 208
C052 0000200 KDOSEL 226, 230, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315, 320, 329, 349
C052 0000400 QUALIFY AIMLETT
C052 0000500 AT 3(2);SET VAL(11, INITRO)=-.73448, VAL(11, IOXY)=-.26552; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C054 0000000 PROCDEF C054
C054 0000100 KDOSEL 65, 66, 67, 124, 137, 139, 141, 154, 165, 168, 178, 181, 182, 195, 199, 200, 201, 206, 226, 230
C054 0000200 KDOSEL 249, 252, 268, 289, 290, 292, 294, 305, 313, 314, 315, 319, 320, 329, 399
C054 0000400 QUALIFY AIMLETT
C054 0000500 AT 3(2);SET VAL(11, INITRO)=-.73448, VAL(11, IOXY)=-.26552; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C057 0000000 PROCDEF C057
C057 0000100 KDOSEL 62, 65, 66, 74, 124, 137, 139, 158, 160, 168, 172, 179, 181, 182, 183, 187, 190, 195, 199
C057 0000200 KDOSEL 201, 206, 226, 230, 248, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315, 320, 321
C057 0000300 KDOSEL 329
C057 0000400 KDOSEL 399
C057 0000500 QUALIFY AIMLETT
C057 0000600 AT 3(2);SET VAL(11, INITRO)=-.73613, VAL(11, IOXY)=-.26387; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C060 0000000 PROCDEF C060
C060 0000100 KDOSEL 62, 65, 66, 74, 124, 137, 139, 158, 160, 168, 172, 179, 181, 182, 183, 187, 190, 195, 199
C060 0000200 KDOSEL 201, 206, 226, 230, 248, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315, 319, 320
C060 0000300 KDOSEL 321, 329
C060 0000400 KDOSEL 399
C060 0000500 QUALIFY AIMLETT
C060 0000600 AT 3(2);SET VAL(11, INITRO)=-.73613, VAL(11, IOXY)=-.26387; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C061 0000000 PROCDEF C061
C061 0000100 KDOSEL 62, 65, 66, 74, 124, 137, 139, 158, 160, 168, 172, 179, 181, 182, 183, 187, 190, 195, 199
C061 0000200 KDOSEL 201, 206, 226, 230, 248, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315, 319, 320
C061 0000300 KDOSEL 321, 329
C061 0000400 KDOSEL 399
C061 0000500 QUALIFY AIMLETT
C061 0000600 AT 3(2);SET VAL(11, INITRO)=-.73928, VAL(11, IOXY)=-.26072; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C063 0000000 PROCDEF C063
C063 0000100 KDOSEL 62, 65, 66, 74, 124, 137, 139, 158, 160, 168, 172, 179, 181, 182, 183, 187, 190, 195, 197
C063 0000200 KDOSEL 199, 201, 206, 226, 230, 248, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315, 319
C063 0000300 KDOSEL 320, 321, 329
C063 0000400 KDOSEL 399
C063 0000500 QUALIFY AIMLETT
C063 0000600 AT 3(2);SET VAL(11, INITRO)=-.7724, VAL(11, IOXY)=-.2276; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C064 0000000 PROCDEF C064
C064 0000100 KDOSEL 62, 65, 66, 74
C064 0000200 KDOSEL 124, 137, 139, 148, 158, 160, 168, 172, 179, 181, 182, 183, 187, 190, 195
C064 0000300 KDOSEL 197, 199, 201, 206, 226, 230, 248, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315
C064 0000400 KDOSEL 319, 320, 321, 329, 399
C064 0000500 QUALIFY AIMLETT
C064 0000600 AT 3(2);SET VAL(11, INITRO)=-.76751, VAL(11, IOXY)=-.23249; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C065 0000000 PROCDEF C065
C065 0000100 KDOSEL 62, 65, 66, 74, 137, 139, 181, 182, 183, 187, 188, 190, 195, 197, 199, 201, 206, 226, 230
C065 0000200 KDOSEL 248, 252, 289, 290, 292, 294, 305, 313, 314, 315, 320, 321, 329, 399
C065 0000400 QUALIFY AIMLETT
C065 0000500 AT 3(2);SET VAL(11, INITRO)=-.76751, VAL(11, IOXY)=-.23249; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C069 0000000 PROCDEF C069
C069 0000100 KDOSEL 62, 65, 66, 74, 137, 139, 181, 182, 183, 187, 190, 195, 197, 199, 221, 206, 226, 230, 248, 252
C069 0000200 KDOSEL 249, 290, 292, 294, 305, 313, 314, 315, 320, 321, 322, 329, 399
C069 0000400 QUALIFY AIMLETT
C069 0000500 AT 3(2);SET VAL(11, INITRO)=-.76479, VAL(11, IOXY)=-.23521; DISPLAY VAL(11, INITRO), VAL(11, IOXY)

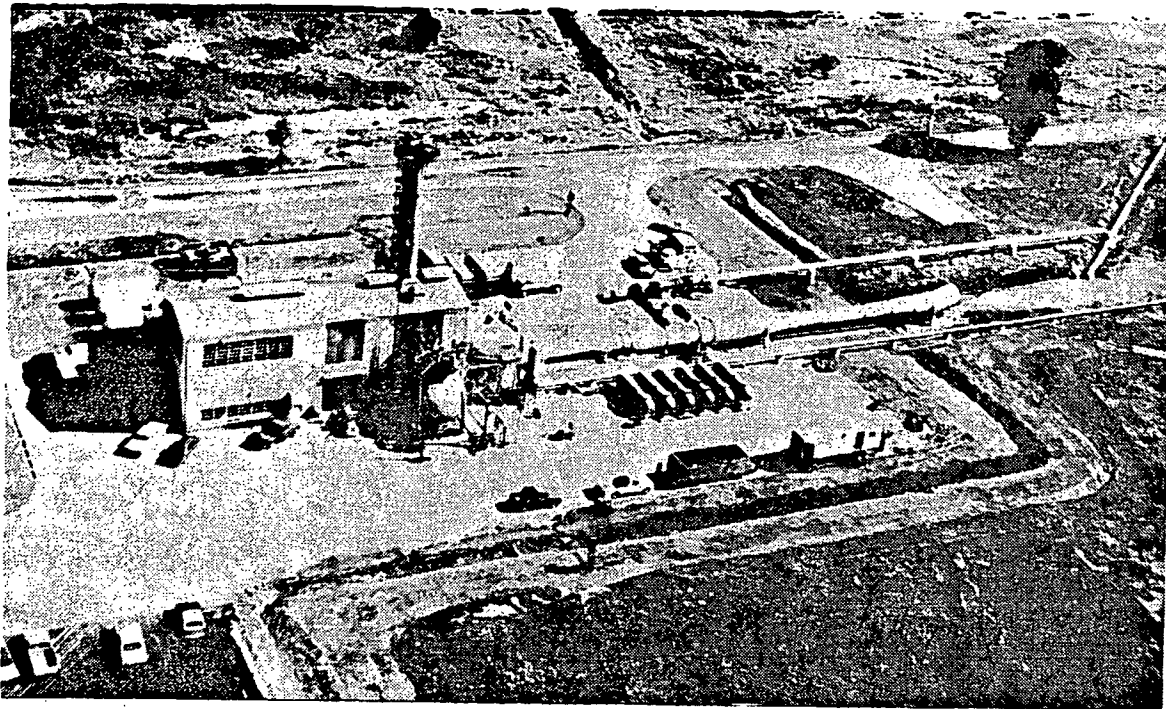
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Table 6. - Concluded.

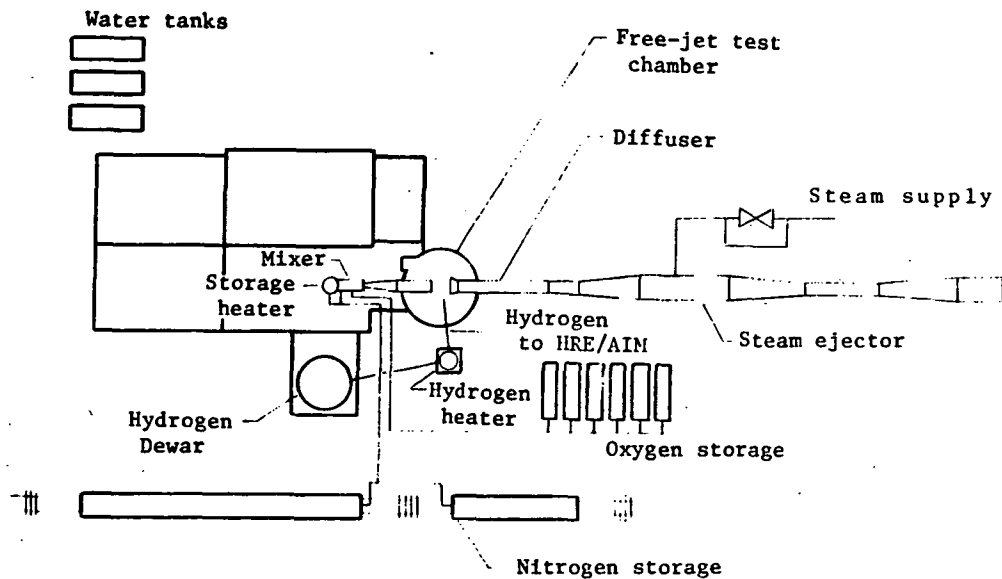
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C071 0000000 PROCDEF C071
C071 0000100 KDOSEL 53, 62, 65, 66, 74, 124, 137, 139, 158, 160, 172, 179, 181, 182, 183, 187, 190, 195, 197, 199
C071 0000200 KDOSEL 201, 206, 226, 230, 248, 249, 252, 289, 290, 292, 294, 305, 313, 314, 315, 320, 321, 322, 329, 399
C071 0000500 QUALIFY AINLETT
C071 0000600 AT 3(2);SET VAL(11, INITRO)=-.75452, VAL(11, IOXY)=-.24548; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C088 0000000 PROCDEF C088
C088 0000100 KDOSEL 19, 22, 23, 54, 55, 60, 62, 64, 67, 74, 95, 124, 137, 139, 157, 158, 160
C088 0000200 KDOSEL 162, 163, 166, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 181
C088 0000300 KDOSEL 182, 183, 187, 190, 195, 197, 199, 206, 226, 227, 230, 235, 241, 248, 249
C088 0000400 KDOSEL 250, 252, 278, 289, 290, 292, 294, 305, 313, 314, 315, 320, 321, 329, 349
C088 0000500 KDOSEL 353, 368, 367, 368, 369, 376, 374, 375, 378, 379, 382, 388, 394, 395, 399
C088 0000800 QUALIFY AINLETT
C088 0000900 AT 3(2);SET VAL(11, INITRO)=-.75328, VAL(11, IOXY)=-.24672; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C088 0001000 QUALIFY ANOZ
C088 0001100 AT 360(3);SET DRAGEX=-0.5*QOAC; DISPLAY DRAGEX, DRAGEX=PSIATM, 'DRAGEX = -0.5*QO=AC'
C088 0001200 QUALIFY CONVTA
C088 0001300 AT 0;SET MV(65)=MV(53), MV(66)=MV(53); DISPLAY MV(53), MV(65), MV(66)
C088 0001400 SETPS 123, 0.690
C089 0000000 PROCDEF C089
C089 0000100 KDOSEL 54, 55, 60, 62, 64, 67, 74, 95, 124, 137, 139, 157, 158, 160, 165, 166, 169
C089 0000200 KDOSEL 172, 175, 176, 179, 181, 182, 183, 187, 190, 195, 197, 199
C089 0000300 KDOSEL 210, 223, 224, 226, 227, 230, 235, 248, 249, 250, 252, 289, 290, 292, 294
C089 0000400 KDOSEL 305, 313, 320, 321, 329, 399
C089 0000600 QUALIFY AINLETT
C089 0000700 AT 3(2);SET VAL(11, INITRO)=-.75148, VAL(11, IOXY)=-.24852; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C089 0000800 QUALIFY CONVTA
C089 0000900 AT 0;SET MV(65)=MV(53), MV(66)=MV(53); DISPLAY MV(53), MV(65), MV(66)
C089 0001000 SETPS 123, 0.690
C090 0000000 PROCDEF C090
C090 0000100 KDOSEL 54, 55, 60, 62, 64, 67, 74, 124, 137, 139, 157, 158, 160, 165, 172, 175, 178
C090 0000200 KDOSEL 179, 181, 182, 183, 187, 190, 195, 197, 199, 202, 203, 206, 207
C090 0000300 KDOSEL 208, 210, 215, 224, 226, 227, 230, 235, 248, 249, 250, 252, 273, 289, 290
C090 0000400 KDOSEL 292, 294, 305, 313, 314, 315, 320, 321, 329
C090 0000500 KDOSEL 399
C090 0000600 QUALIFY AINLETT
C090 0000700 AT 3(2);SET VAL(11, INITRO)=-.7389, VAL(11, IOXY)=-.2611; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C090 0000800 QUALIFY CONVTA
C090 0000900 AT 0;SET MV(65)=MV(53), MV(66)=MV(53); DISPLAY MV(53), MV(65), MV(66)
C091 0000000 PROCDEF C091
C091 0000100 KDOSEL 54, 55, 60, 62, 64, 67, 74, 95, 124, 137, 139, 148, 157, 158, 160, 165, 172
C091 0000200 KDOSEL 175, 176, 179, 181, 182, 183, 187, 190, 195, 197, 199, 206, 208
C091 0000300 KDOSEL 226, 227, 230, 235, 248, 249, 250, 252, 289, 290, 292, 294, 305, 313
C091 0000400 KDOSEL 314, 315, 320, 321, 329, 389
C091 0000600 QUALIFY AINLETT
C091 0000700 AT 3(2);SET VAL(11, INITRO)=-.7349, VAL(11, IOXY)=-.2611; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C091 0000800 QUALIFY ENPGPM
C091 0000900 SET ALPHA=3.0; DISPLAY ALPHA
C091 0001000 QUALIFY CONVTA
C091 0001100 AT 0;SET MV(65)=MV(61), MV(66)=MV(61); DISPLAY MV(61), MV(65), MV(66)
C091 0001200 SETPS 123, 0.690
C092 0000000 PROCDEF C092
C092 0000100 KDOSEL 54, 55, 60, 62, 64, 67, 74, 137, 139, 148, 175, 176, 182, 182, 183, 187, 190, 195
C092 0000200 KDOSEL 197, 199, 206, 208, 226, 227, 230, 232, 248, 252, 265, 266
C092 0000300 KDOSEL 267, 268, 270, 271, 272, 289, 290, 292, 294, 365
C092 0000400 KDOSEL 313, 314, 315, 320, 321, 329, 399
C092 0000500 QUALIFY ANOZ
C092 0000600 AT 360(3);SET DRAGEX=-0.5*QOAC; DISPLAY DRAGEX, DRAGEX=PSIATM, 'DRAGEX = -0.5*QO=AC'
C092 0000700 QUALIFY CONVTA
C092 0000800 AT 0;SET MV(65)=MV(53), MV(66)=MV(53); DISPLAY MV(53), MV(65), MV(66)
C093 0000000 PROCDEF C093
C093 0000100 COMACH5
C093 0000200 KDOSEL 96
C093 0000500 QUALIFY AINLETT
C093 0000600 AT 3(2);SET VAL(11, INITRO)=-.655704, VAL(11, IOXY)=-.344296; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C093 0000700 TUNNOPT 3
C094 0000000 PROCDEF C094
C094 0000100 COMACH5
C094 0000500 QUALIFY AINLETT
C094 0000700 AT 3(2);SET VAL(11, INITRO)=-.76284, VAL(11, IOXY)=-.23716; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C094 0000800 TUNNOPT 3
C095 0000000 PROCDEF C095
C095 0000100 COMACH5
C095 0000600 QUALIFY AINLETT
C095 0000700 AT 3(2);SET VAL(11, INITRO)=-.7486, VAL(11, IOXY)=-.25138; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C095 0000800 TUNNOPT 3
C096 0000000 PROCDEF C096
C096 0000100 COMACH5
C096 0000600 QUALIFY AINLETT
C096 0000700 AT 3(2);SET VAL(11, INITRO)=-.76488, VAL(11, IOXY)=-.23512; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C096 0000800 TUNNOPT 3
C097 0000000 PROCDEF C097
C097 0000100 KDOSEL 54, 55, 60, 62, 64, 65, 66, 67, 74, 124, 137, 139, 181, 182, 183, 187, 190, 195, 197
C097 0000200 KDOSEL 199, 226, 230, 248, 252, 280, 289, 290, 292, 294, 305, 313, 314, 315, 320, 321, 329, 399
C097 0000500 QUALIFY AINLETT
C097 0000600 AT 3(2);SET VAL(11, INITRO)=-.77086, VAL(11, IOXY)=-.22914; DISPLAY VAL(11, INITRO), VAL(11, IOXY)
C097 0000700 QUALIFY ANOZ
C097 0000800 AT 360(3);SET DRAGEX=-0.5*QOAC; DISPLAY DRAGEX, DRAGEX=PSIATM, 'DRAGEX = -0.5*QO=AC'
C097 0000900 TUNNOPT 3
C097 0001000 QUALIFY ACMBSTR
C097 0001100 AT 360(3);SET XCTP=XCT; DISPLAY XSLX, XCT, XCTP, XSTE, 'SUBSONIC COMBUSTION'
C097 0000000 PROCDEF C097
C097 0000100 KDOSEL 54, 55, 60, 62, 64, 65, 66, 67, 74, 124, 137, 139, 157, 158, 160, 162, 165, 172, 176, 178
C097 0000200 KDOSEL 181, 182, 183, 187, 190, 195, 197, 199, 206, 226, 230, 248, 249, 252, 280, 289, 290, 292, 294, 305
C097 0000300 KDOSEL 313, 314, 315, 320, 321, 329, 399

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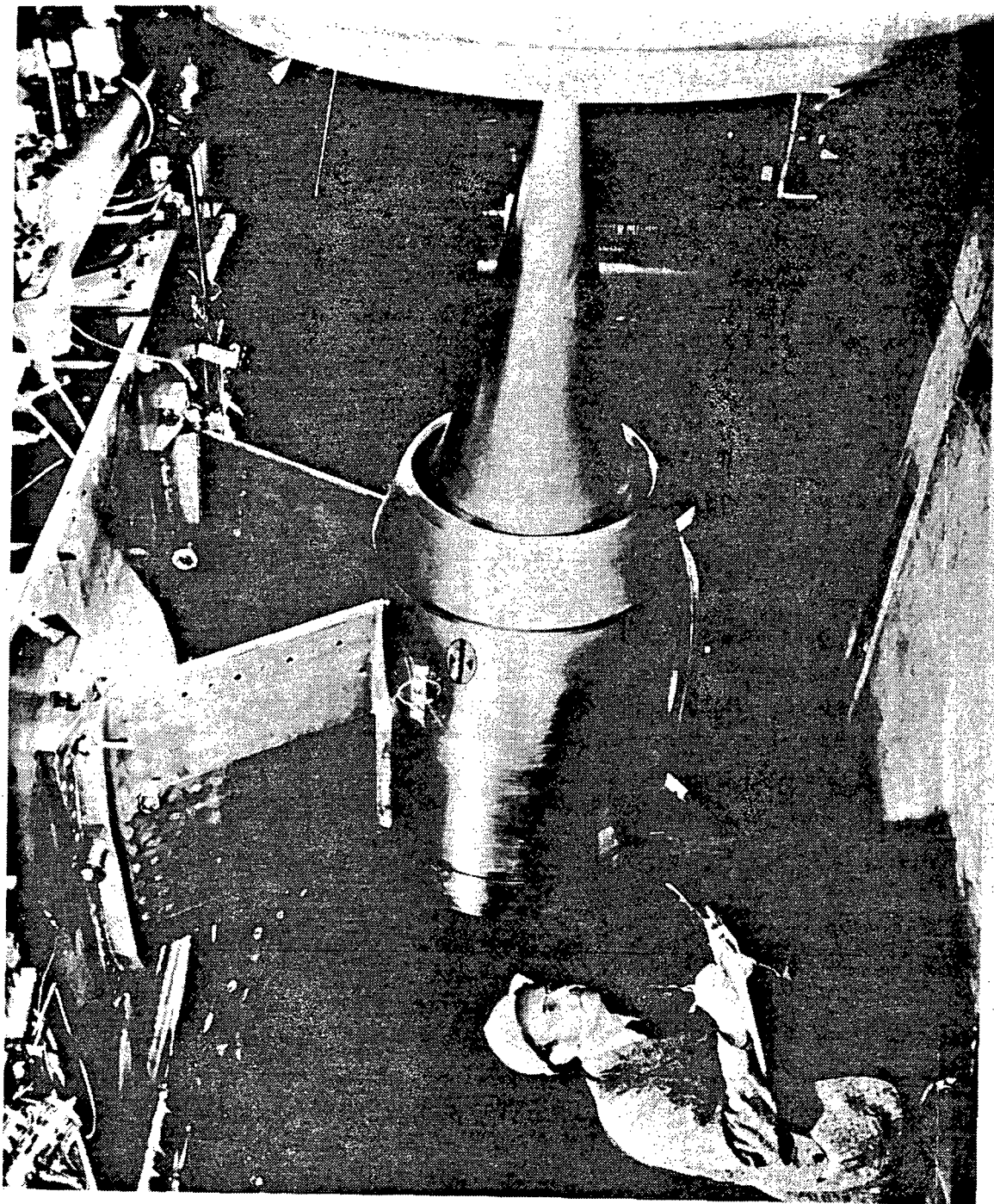
(a) Hypersonic Tunnel Facility (HTF).



(b) Schematic layout of the NASA - Lewis - Plum Brook Hypersonic Tunnel Facility(HTF).

Figure 1. - NASA - Lewis Research Center's Plum Brook Station Hypersonic Tunnel Facility (HTF) and the Hypersonic Research Engine/ Aerothermodynamic Integration Model (HRE/AIM) installation.

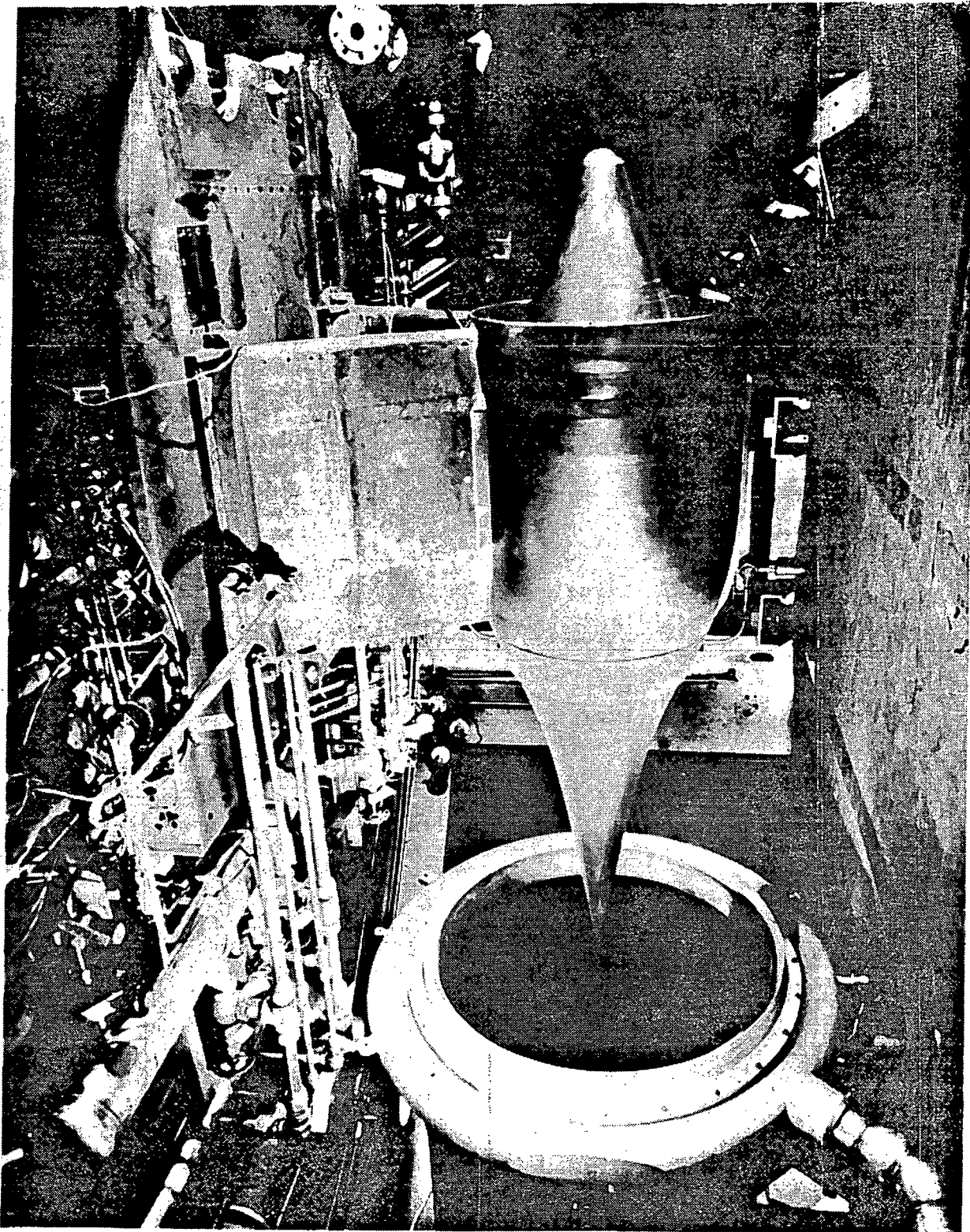




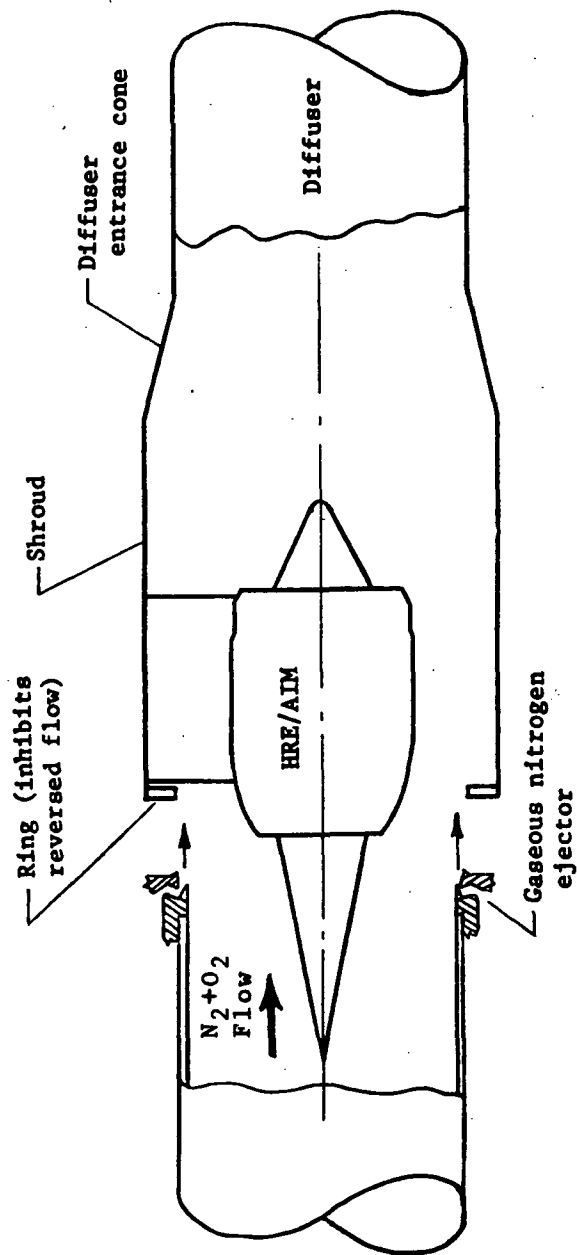
(c) HRE/AIM partially installed; pretest.

Figure 1. - Continued.

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(d) HRE/AIM partially installed; Mach 5, 5, and 7 post test.



(e) Schematic of HRE/ATM test section located in the free-jet test chamber of the HTP.

Figure 1. - Concluded.

CIRCUMFERENTIAL LOCATIONS  
(Looking Downstream)

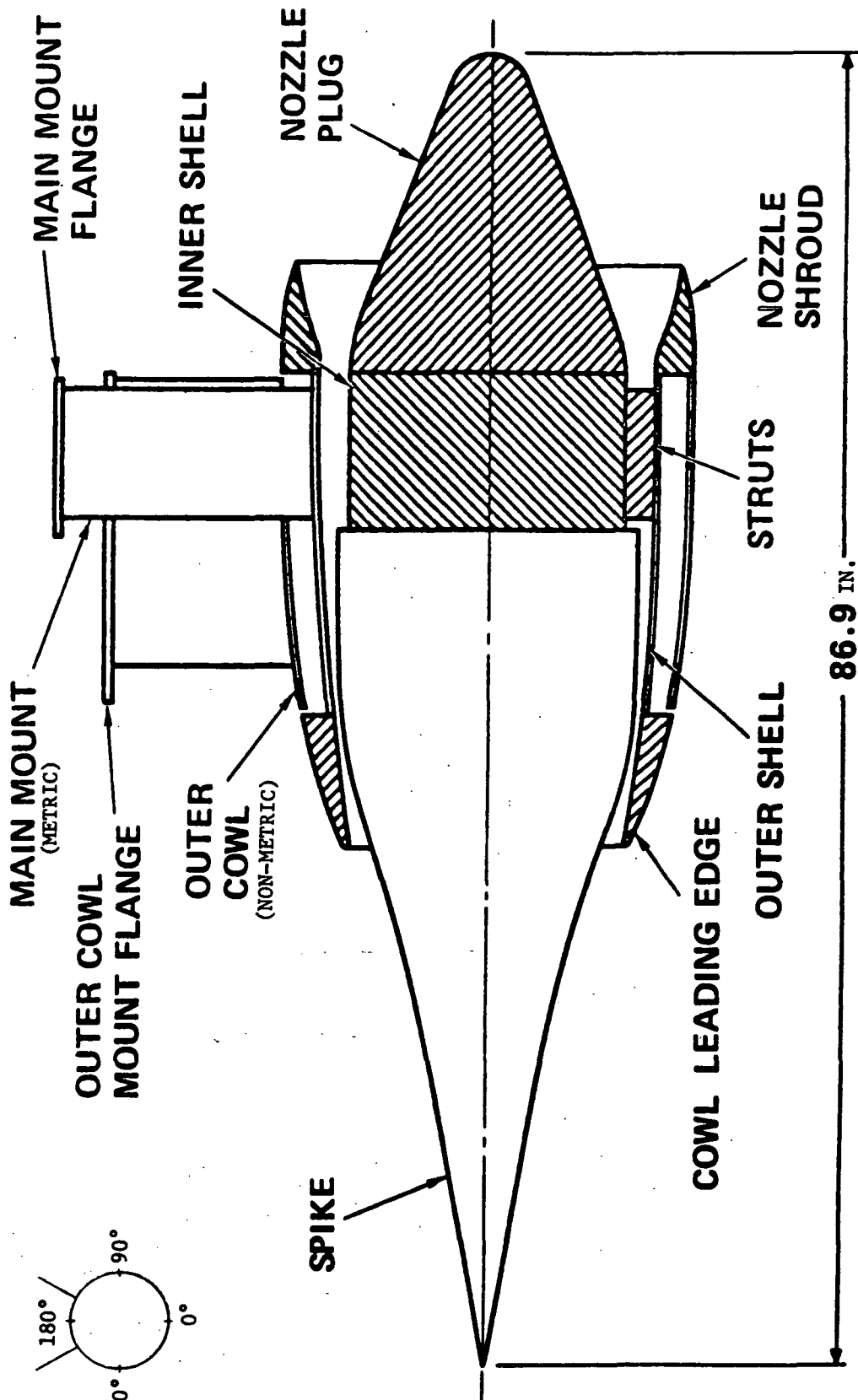
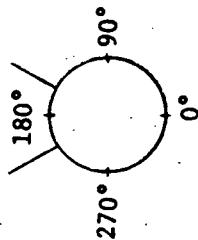
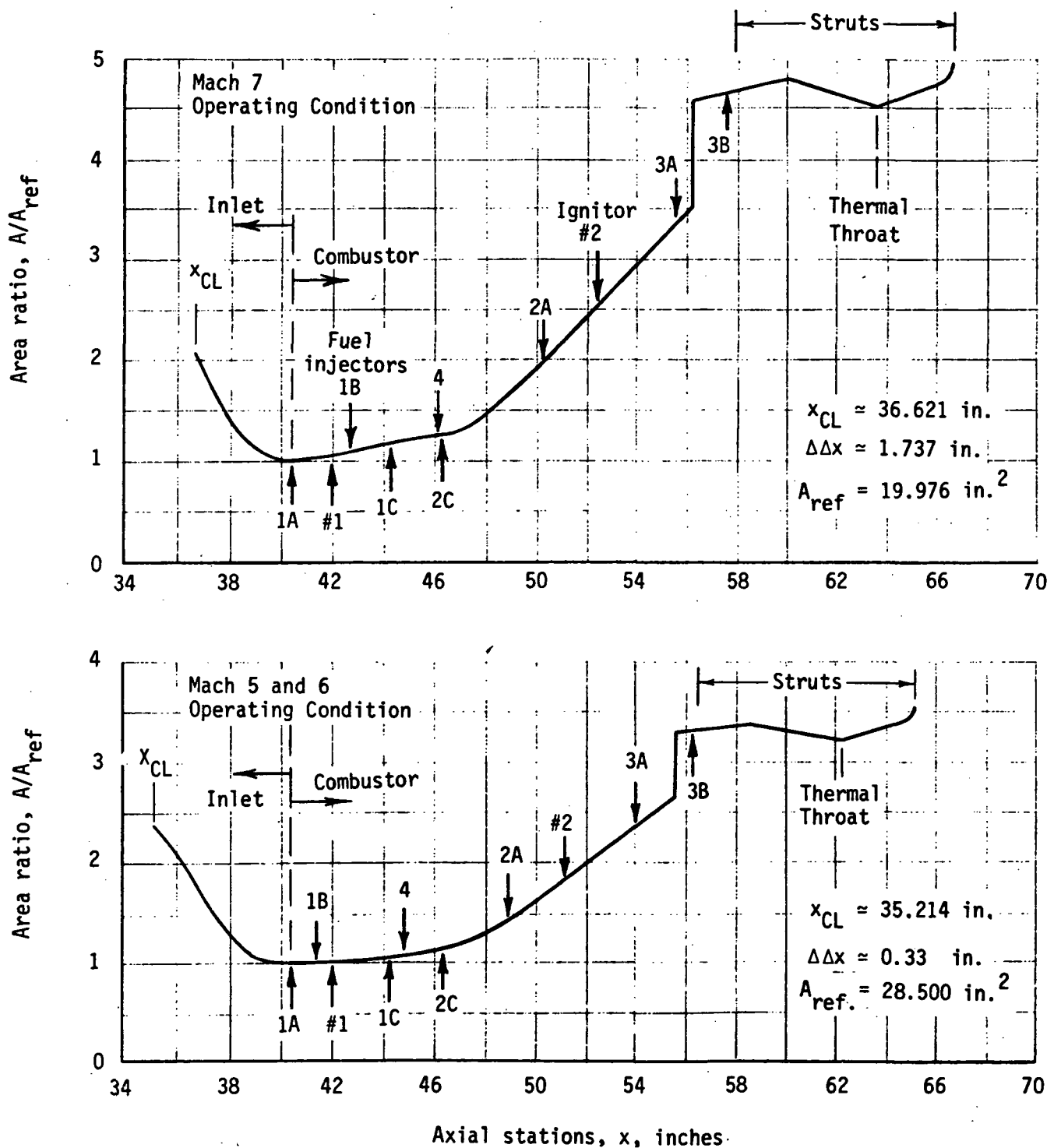


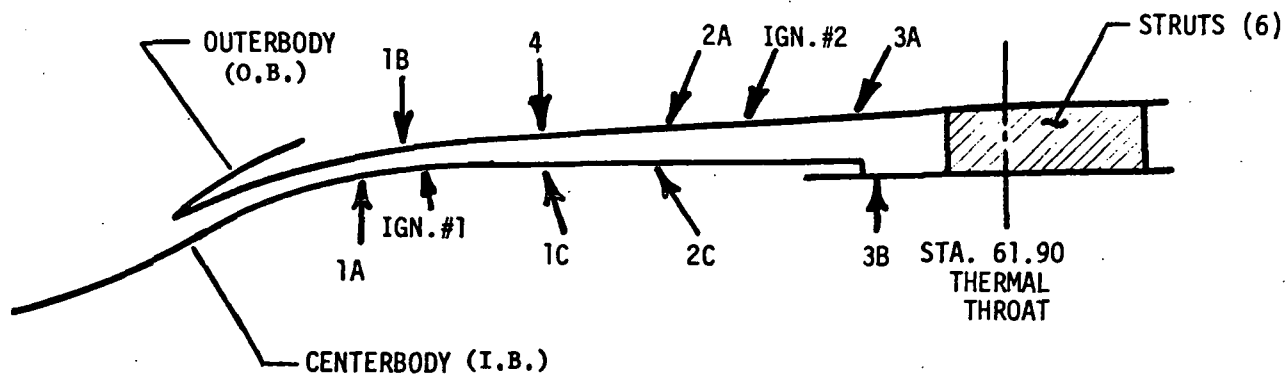
Figure 2. - General Configuration of the AIM



(a) Combustor area ratio distributions

Figure 3. - HRE/AIM combustor information.

# COMBUSTOR CONFIGURATION



## INJECTOR PARAMETERS (Mach 6 position, $x_{CL} = 34.884$ in.)

Injector	Number of Injectors	Diameter, in.	Injection Angle <sup>a</sup> , deg.	S/d	x, in.	Location
1A	37	0.119	90	13.1	40.5	I.B.
1B	37	0.119	90	13.9	41.25	O.B.
1C	37	0.119	106	13.5	44.5	I.B.
4	37	0.119	90	14.2	44.5	O.B.
2A	60	0.095	67	11.4	48.5	O.B.
2C	60	0.095	119	10.6	46.5	I.B.
3A	114	0.090	65	7.0	53.75	O.B.
3B	102	0.095	90	6.3	55.9	I.B.

## IGNITOR PARAMETERS

Ignitor	x, in.	Circumferential locations						Injection Angle <sup>a</sup> , deg.	Location
1 <sup>c</sup>	42.00	55	110	165	230	290	350	94.5	I.B.
2	50.98	40	100	-	220	240	280	60.0 <sup>b</sup>	O.B.

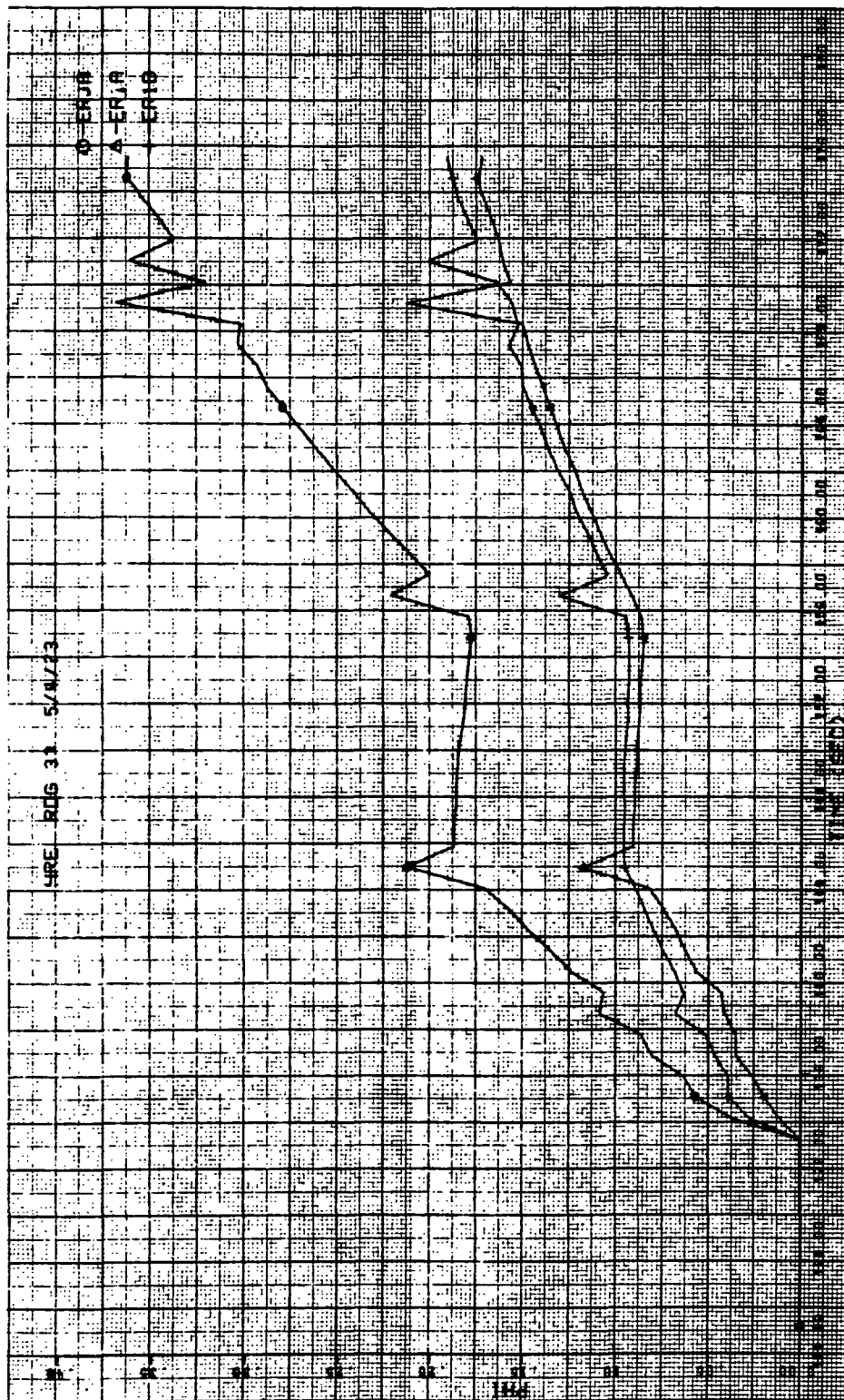
a. With respect to AIM centerline.

b. Also looking upstream, ignitors #2 are inclined 30° clockwise.

c. Plug welded prior to reading 57.

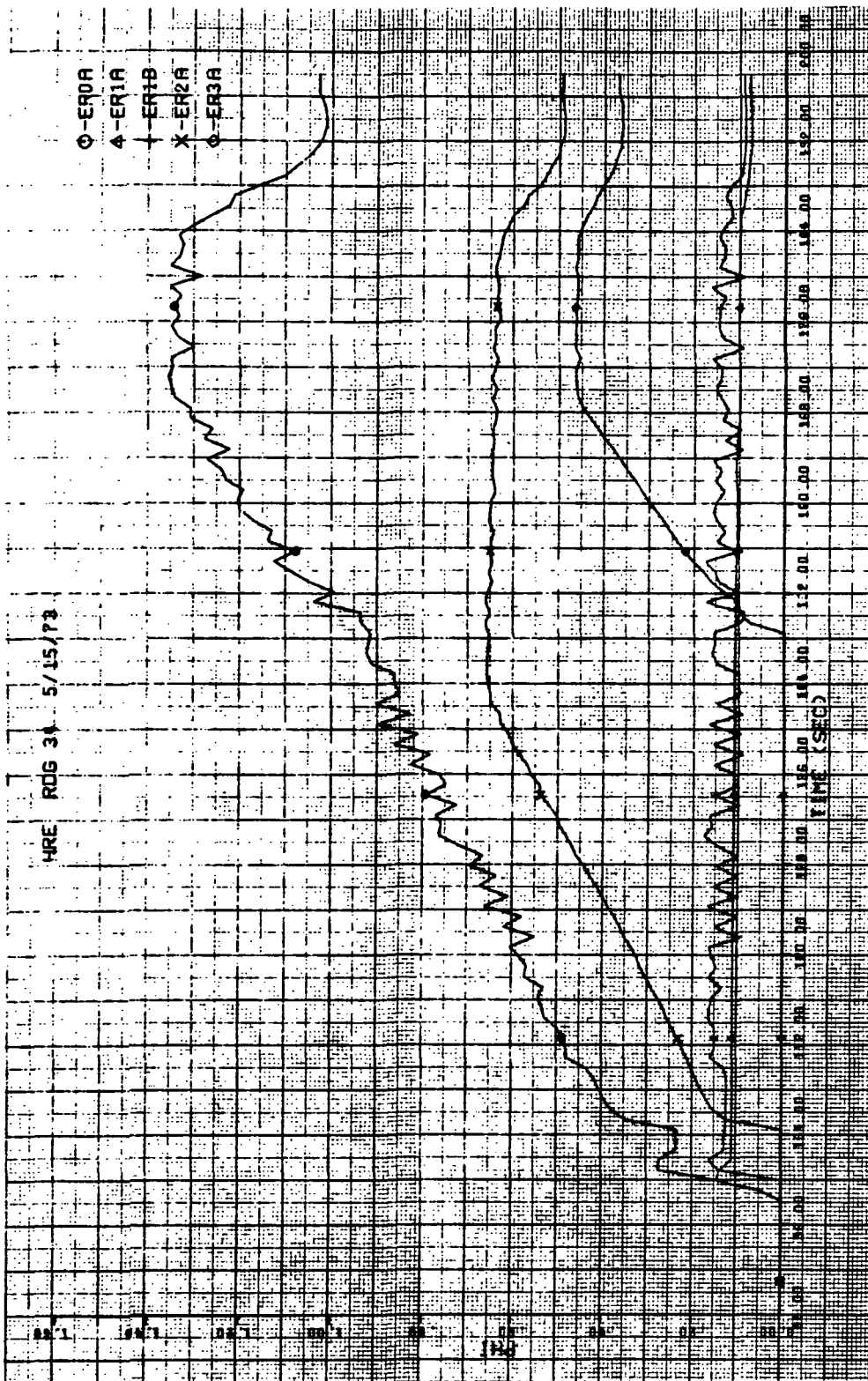
(b) Combustor configuration and parameters.

Figure 3. - Concluded.



(a) Reading 33 - Measured Equivalence Ratio,  $\phi$

Figure 4. - HRE/AIM fuel equivalence ratio;  
Mach 6 component integration results.



(b) Reading 34 - Measured Equivalence Ratio,  $\phi$

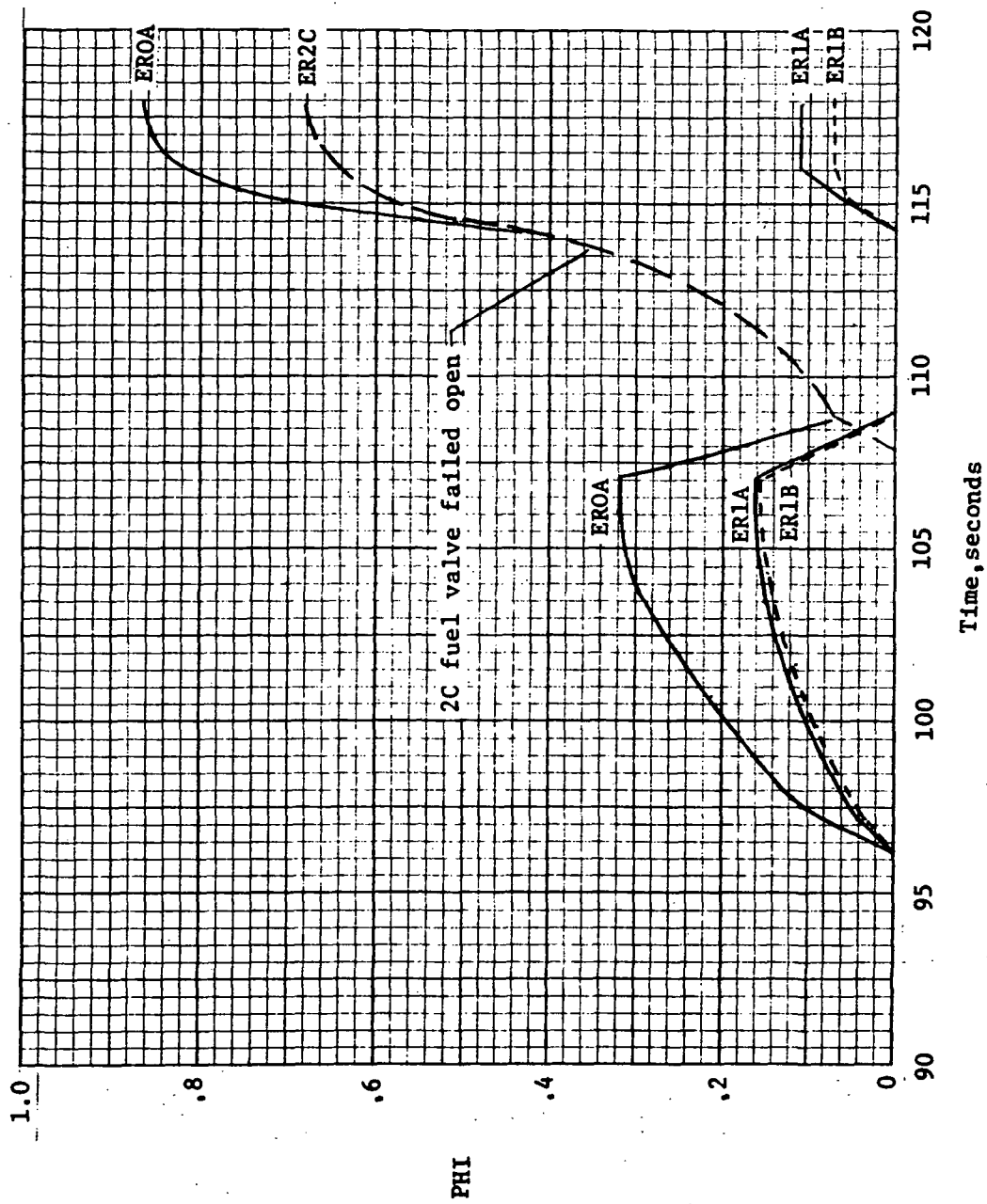
Figure 4. - Continued.





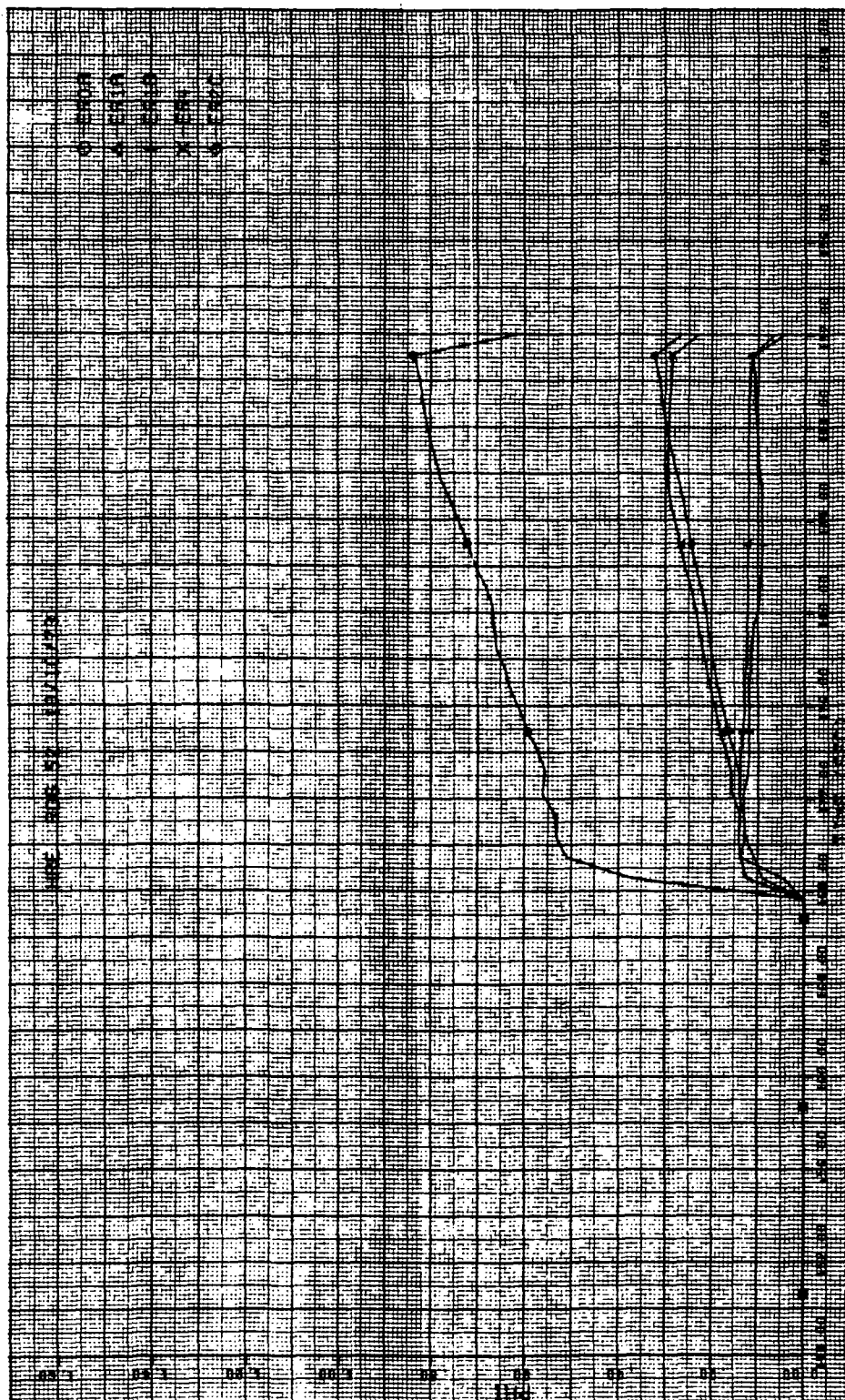
(c) Reading 36 - Measured Equivalence Ratio,  $\phi$

Figure 4. - Continued.



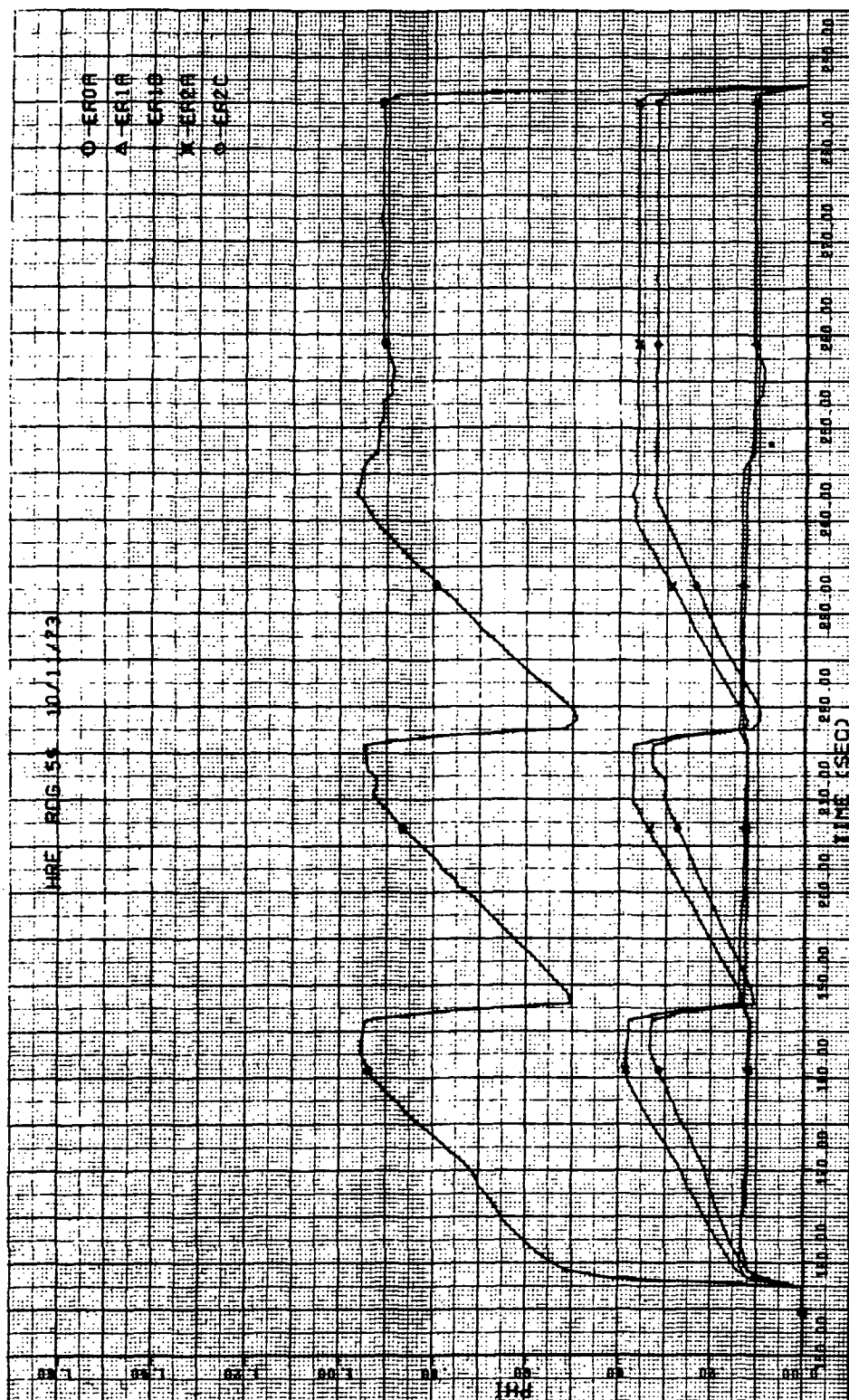
(d) Reading 38 - Measured equivalence ratio,  $\phi$

Figure 4. - Continued.



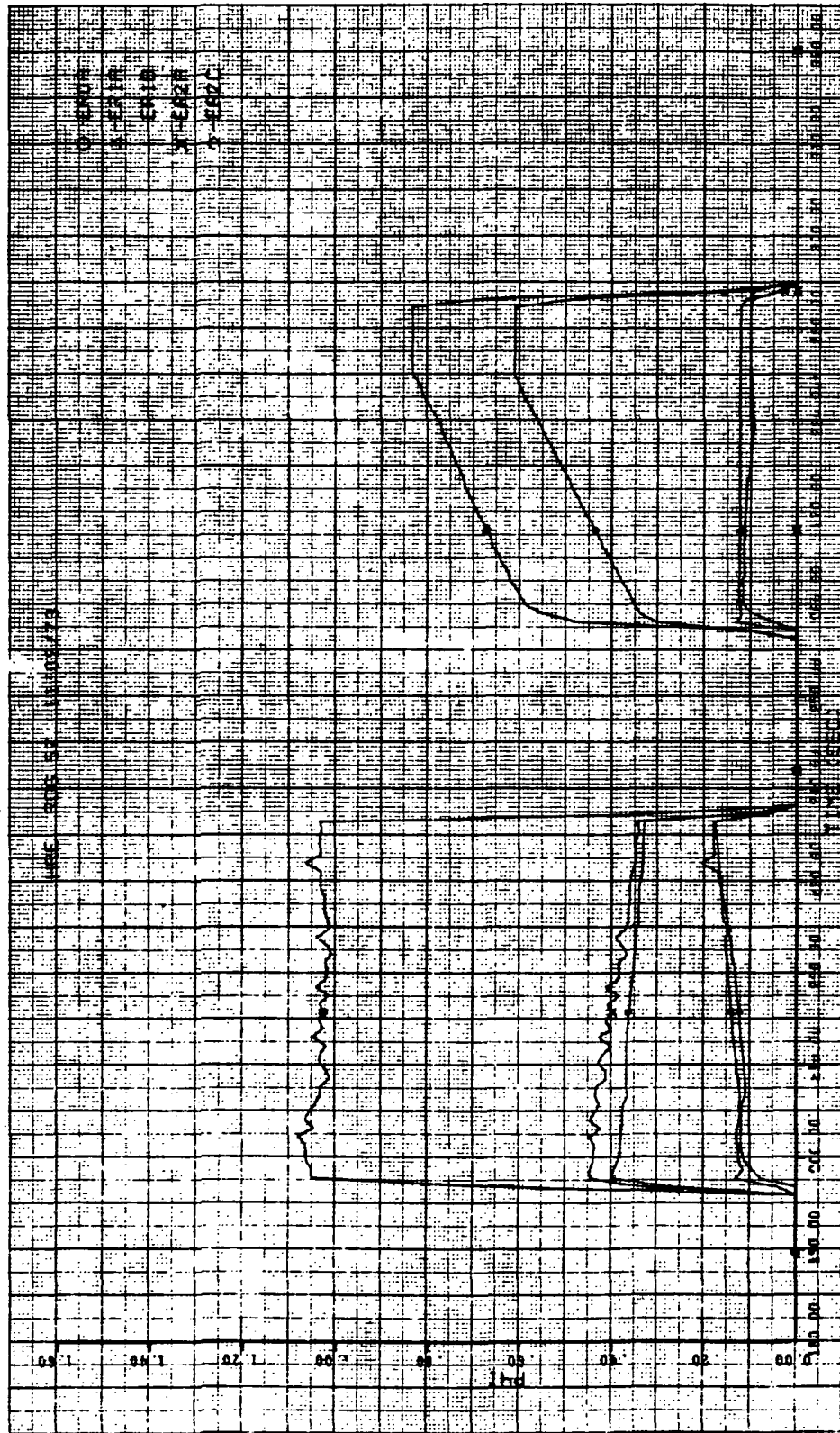
(e) Reading 52 - Measured Equivalence Ratio,  $\phi$

Figure 4. - Continued.



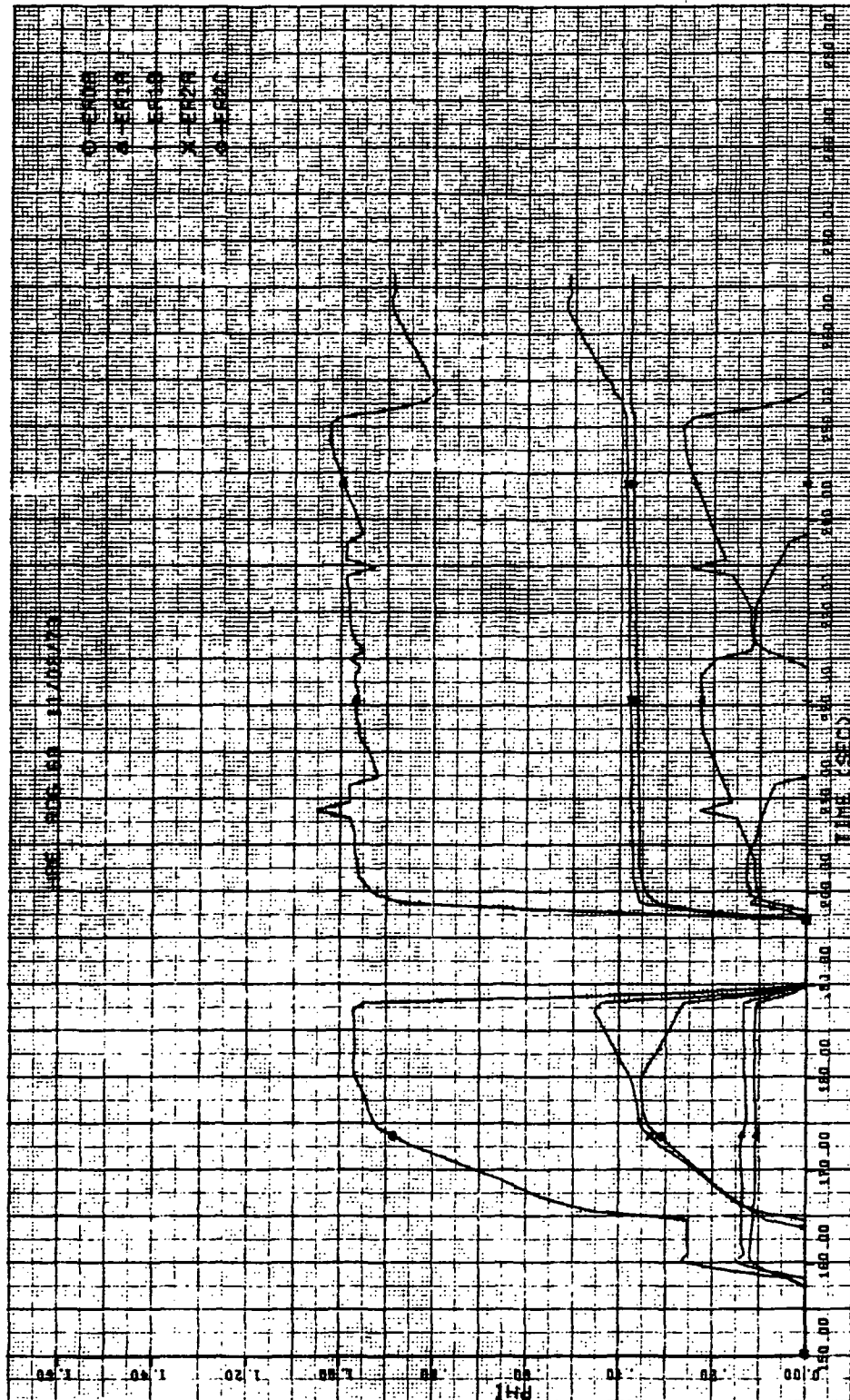
(f) Reading 54 - Measured Equivalence Ratio,  $\phi$

Figure 4. - Continued.



(g) Reading 57 - Measured Equivalence Ratio,  $\phi$

Figure 4. - Continued.



(h) Reading 60 - Measured Equivalence Ratio,  $\phi$

Figure 4. - Concluded,

Reading 34

$t = 98.15 \text{ sec,}$

12/23/74

READING = 0034 BLACK = 75 TIME = 98.152 MACH 6.0 PI = 745.749 II = 2965.5  
 RAMJET PERFORMANCE

SUMMARY REPORT

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P	I	M	GAMMA	MOLWT	SONV	MACH	VEL	S	A/A	A	MU/P	Q	IVAC	PHI	IIAC
WIND TUNNEL	1	0	5												
0.000	745.749	2966	650.9( 784)	1.2937	28.972	2566									
0.000	0.384	400	332.9( 96)	1.3988	28.971	980	6.0U5	5884	1.824	0.10588	26.650	0.9827	4970	2.682	186.5
SPIKE TIP	2	0	5												
0.600	18.087	2965	650.9( 784)	1.2936	28.971	2566									
0.600	18.379	2999	639.0( 765)	1.2958	28.971	2539	0.394	1000	2.074	0.10588	26.650	0.9827	4950	1.645	185.0
WIND TUNNEL	3	0	0												
0.000	745.749	2966	650.9( 784)	1.2937	28.972	2566									
0.000	0.381	399	331.1( 96)	1.3988	28.971	979	6.012	5885	1.824	0.10536	26.519	0.9827	4946	9.635	186.5
SPIKE TIP	4	0	0												
0.600	18.087	2965	650.9( 784)	1.2936	28.971	2566									
0.600	18.198	2900	639.2( 765)	1.2957	28.972	2539	0.391	994	2.079	0.10536	26.519	0.9827	4946	1.627	186.5
INLET THROAT	5	0	5												
40.400	252.842	2900	639.2( 765)	1.2958	28.972	2539									
40.400	17.082	1505	243.5( 372)	1.3475	28.971	1866	2.385	4450	1.891	0.94662	26.650	0.1094	4167	65.461	156.3
INLET UPNRS	6	0	3												
40.400	252.842	2900	639.2( 765)	1.2958	28.972	2539									
40.400	14.831	1446	227.3( 357)	1.3509	28.971	1831	2.478	4537	1.891	0.86057	26.650	0.1204	4211	80.676	158.0
INLET DNRS	7	0	4												
40.400	120.327	2900	639.2( 765)	1.2958	28.972	2539									
40.400	102.501	2795	607.9( 734)	1.2992	28.972	2496	0.501	1252	1.942	0.86057	26.650	0.1209	4211	16.741	158.0
COMBUSTOR	8	0	1	5											
40.410	252.399	2900	639.2( 765)	1.2958	28.972	2539									
40.410	17.097	1506	243.8( 373)	1.3475	28.971	1866	2.385	4448	1.891	0.94651	26.650	0.1094	4169	65.429	156.3
COMBUSTOR	9	0	2	5											
41.372	222.678	2888	635.5( 761)	1.2962	28.972	2534									
41.372	18.516	1500	263.5( 392)	1.3435	28.971	1909	2.260	4314	1.894	0.94785	26.650	0.1098	4094	63.550	153.4
COMBUSTOR	10	0	3	5											
41.437	221.348	2887	635.2( 761)	1.2963	28.972	2534									
41.437	18.576	1503	264.3( 393)	1.3434	28.971	1911	2.255	4308	1.894	0.94786	26.650	0.1098	4091	63.434	153.4
COMBUSTOR	11	0	4	5											
41.500	220.250	2886	634.9( 761)	1.2963	28.972	2534									
41.500	18.647	1586	269.1( 395)	1.3432	28.971	1912	2.249	4301	1.894	0.94806	26.650	0.1098	4087	63.374	153.4
COMBUSTOR	12	0	5	21											
42.460	183.365	2869	630.2( 756)	1.2968	28.960	2528									
42.460	11.146	1447	228.1( 357)	1.3508	28.959	1832	2.448	4446	1.911	0.93904	26.659	0.1106	4033	65.459	151.3
COMBUSTOR	13	0	6	21											
44.157	172.556	2842	622.8( 748)	1.2977	28.959	2516									
44.157	15.260	1577	262.8( 392)	1.3437	28.958	1907	2.223	4241	1.912	0.90334	26.659	0.1152	3964	59.532	148.7
COMBUSTOR	14	0	7	21											
44.310	170.474	2844	621.8( 749)	1.2975	28.963	2517									
44.310	15.199	1581	262.8( 393)	1.3435	28.963	1910	2.218	4236	1.913	0.90274	26.659	0.1153	3959	59.430	148.5
COMBUSTOR	15	0	8	21											
44.600	166.186	2833	614.1( 746)	1.2980	28.960	2512									
44.600	15.004	1580	263.3( 392)	1.3436	28.959	1909	2.211	4220	1.914	0.89965	26.659	0.1157	3941	58.997	147.8
COMBUSTOR	16	0	9	21											
44.872	165.360	2831	618.8( 745)	1.2980	28.959	2512									
44.872	14.895	1578	262.9( 392)	1.3437	28.958	1908	2.212	4220	1.914	0.89906	26.659	0.1158	3938	58.962	147.7
COMBUSTOR	17	0	10	21											
46.260	144.661	2826	616.0( 743)	1.2981	28.964	2509									
46.260	12.788	1587	258.8( 389)	1.3442	28.963	1901	2.243	4228	1.923	0.84023	26.659	0.1227	3905	55.724	146.5
COMBUSTOR	18	0	11	21											
47.310	129.054	2825	616.8( 743)	1.2982	28.960	2509									
47.310	11.195	1559	257.1( 387)	1.3447	28.959	1897	2.235	4234	1.930	0.78889	26.659	0.1319	3891	51.971	145.4



HEADING = 0034 BLOCK = 75 TIME = 98.152 NACH 0.0 PT = 745.704 IT = 2065.5

	P	T	M	GAMMA	MOLAL	SUNV	MACH	VEL	S	W/A	A/AC	MQPM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	14	12	21												
47.397	127.379	2825	610.9	(743)	1.2982	28.954	2509									
47.397	10.912	1554	250.5	(305)	1.3449	20.954	1894	2.242	4247	1.931	0.78276	26.059	0.1330	3890	51.061	145.9 0.00 0.01
COMBUSTOR	0	20	13	21												
48.110	116.443	2831	617.4	(745)	1.2979	28.965	2512									
48.110	9.510	1539	251.1	(301)	1.3457	20.965	1895	2.271	4282	1.938	0.73470	26.059	0.1417	3893	48.886	146.0 0.00 0.01
COMBUSTOR	0	21	14	21												
48.847	114.223	2829	617.9	(744)	1.2981	28.960	2511									
48.847	9.563	1547	254.5	(304)	1.3453	20.959	1890	2.256	4264	1.934	0.66976	26.059	0.1554	3914	44.386	146.6 0.00 0.12
COMBUSTOR	0	22	15	21												
49.377	114.078	2829	618.3	(745)	1.2981	28.959	2511									
49.377	10.125	1571	261.0	(300)	1.3440	20.959	1904	2.221	4228	1.939	0.62639	26.059	0.1662	3934	41.158	147.6 0.00 0.02
COMBUSTOR	0	23	16	21												
52.887	92.699	2834	619.9	(746)	1.2979	28.952	2513									
52.887	5.512	1419	220.8	(350)	1.3525	20.952	1815	2.462	4469	1.955	0.43766	26.065	0.2379	4040	30.396	151.5 0.00 0.03
COMBUSTOR	0	24	17	21												
53.387	90.590	2835	620.0	(746)	1.2979	28.952	2514									
53.387	5.250	1410	218.4	(347)	1.3530	20.951	1810	2.477	4483	1.958	0.41978	26.065	0.2480	4049	24.247	151.6 0.00 0.00
COMBUSTOR	0	25	18	21												
54.137	86.430	2840	620.3	(748)	1.2977	28.957	2515									
54.137	4.766	1394	213.1	(343)	1.3539	20.957	1800	2.567	4514	1.960	0.39570	26.065	0.2631	4062	21.757	152.3 0.00 0.43
COMBUSTOR	0	26	19	21												
54.897	83.022	2837	620.5	(747)	1.2978	28.953	2514									
54.897	4.275	1368	207.2	(336)	1.3555	20.952	1784	2.598	4547	1.962	0.37419	26.065	0.2782	4073	26.444	152.8 0.00 0.04
COMBUSTOR	0	27	20	21												
55.760	77.320	2837	620.7	(747)	1.2978	28.952	2514									
55.760	3.288	1331	197.6	(327)	1.3577	20.952	1762	2.611	4600	1.967	0.35277	26.065	0.2951	4084	25.219	153.1 0.00 0.01
COMBUSTOR	0	28	21	21												
56.322	68.305	2846	620.8	(749)	1.2974	28.962	2518									
56.322	3.141	1333	195.7	(327)	1.3575	20.962	1763	2.616	4612	1.970	0.28293	26.065	0.3079	4118	20.279	154.4 0.00 0.90
COMBUSTOR	0	29	22	21												
56.377	62.913	2838	620.8	(747)	1.2978	28.953	2515									
56.377	2.393	1284	179.9	(309)	1.3619	20.953	1719	2.732	4697	1.982	0.28215	26.065	0.3690	4119	20.594	154.5 0.00 0.13
COMBUSTOR	0	30	23	21												
56.517	62.345	2837	620.8	(747)	1.2978	28.952	2515									
56.517	2.337	1258	178.9	(308)	1.3622	20.952	1716	2.741	4703	1.982	0.28017	26.065	0.3716	4120	20.475	154.6 0.00 0.02
COMBUSTOR	0	31	24	21												
56.597	67.866	2841	620.8	(748)	1.2976	28.956	2516									
56.597	2.923	1307	190.6	(320)	1.3592	20.956	1747	2.656	4640	1.977	0.28331	26.065	0.3675	4120	20.428	154.5 0.00 0.35
COMBUSTOR	0	32	25	21												
56.877	66.543	2838	620.9	(747)	1.2978	28.952	2515									
56.877	2.700	1285	185.7	(315)	1.3605	20.952	1733	2.693	4666	1.978	0.28237	26.065	0.3687	4122	20.476	154.6 0.00 0.05
COMBUSTOR	0	33	26	21												
57.103	67.253	2838	620.9	(747)	1.2978	28.952	2515									
57.103	2.768	1290	187.1	(316)	1.3602	20.952	1736	2.684	4659	1.977	0.28184	26.065	0.3694	4123	20.406	154.6 0.00 0.01
COMBUSTOR	0	34	27	21												
58.847	70.058	2838	621.0	(747)	1.2978	28.952	2515									
58.847	3.300	1337	199.3	(328)	1.3573	20.951	1765	2.602	4594	1.974	0.27565	26.065	0.3777	4126	19.679	150.7 0.00 0.00
COMBUSTOR	0	35	28	21												
60.857	59.693	2839	620.9	(748)	1.2977	28.954	2515									
60.857	2.172	1250	179.2	(306)	1.3627	20.954	1710	2.758	4717	1.985	0.28325	26.065	0.3650	4113	20.911	154.2 0.00 0.14
COMBUSTOR	0	36	29	21												
62.277	45.235	2837	620.7	(747)	1.2978	28.952	2515									
62.277	1.356	1165	160.1	(289)	1.3668	20.952	1664	2.878	4801	2.004	0.29296	26.065	0.3553	4102	21.058	153.8 0.00 0.03
COMBUSTOR	0	37	30	21												
64.741	64.837	2835	620.0	(746)	1.2979	28.952	2514									
64.741	3.452	1374	210.3	(339)	1.3548	20.951	1791	2.528	4528	1.979	0.27771	26.065	0.3709	4084	19.540	153.2 0.00 0.00

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COMBUSTOR	P	T	M	GAMMA	MULMT	SUNY	MACH	VEL	S	W/A	"	A/AC	MURPH	L	1.00	PHI	ETAC
05-117	62.008	2838	619.9( 747)	1.2977	28.956	2515	2.414	4428	1.982	0.25818	26.665	0.0032	4062	17.760	153.1	0.00	0.35
05-117	3.988	1450	228.1( 358)	1.3506	28.956	1834											
COMBUSTOR	39	32	4														
05-117	62.008	2967	658.8( 785)	1.2936	28.956	2567											
05-117	5.108	1625	274.8( 405)	1.3412	28.956	1935	2.266	4384	1.996	0.25818	26.665	0.0032	4161	17.589	156.0	0.00	0.35
NOZZLE	AE	40	33	3													
07-353	62.008	2838	619.9( 746)	1.2977	28.956	2515											
07-353	0.430	792	61.0( 191)	1.3899	28.956	1375	3.845	5288	1.982	0.05374	26.665	1.9371	4596	4.417	172.4	0.00	0.35
NOZZLE	P0	41	34	3													
07-353	62.008	2838	619.9( 746)	1.2977	28.956	2515											
07-353	0.384	768	55.0( 185)	1.3911	28.956	1354	3.926	5317	1.982	0.04981	26.665	2.0899	4612	4.116	173.0	0.00	0.35
NOZZLE	AE	42	35	3													
07-353	62.008	2967	658.8( 785)	1.2936	28.956	2567											
07-353	0.450	848	74.5( 204)	1.3871	28.956	1421	3.806	5407	1.996	0.05374	26.665	1.9371	4705	4.516	176.4	0.00	0.35
NOZZLE	P0	43	36	3													
07-353	62.008	2967	658.8( 785)	1.2936	28.956	2567											
07-353	0.384	811	65.6( 193)	1.3860	28.956	1391	3.916	5449	1.996	0.04832	26.665	2.1544	4728	4.092	177.3	0.00	0.35
FICTIVE	COMBUSTOR	62	55	0													
05-117	252.842	2844	619.9( 749)	1.2974	28.964	2517											
05-117	0.384	517	-7.6( 124)	1.3967	28.963	1114	5.030	5604	1.088	0.07800	26.665	1.3347	4775	6.794	179.1	0.00	1.00
FICTIVE	NOZZLE	63	56	0													
07-353	73.351	2735	584.3( 717)	1.3010	28.956	2472											
07-353	0.389	711	41.2( 171)	1.3935	28.956	1304	4.015	5237	1.963	0.05374	26.665	1.9371	4534	4.374	170.0	0.00	0.35

XAB8	P-18	P-08	PDA	DOX	W-18	Q-08	C-ALL	P-18/P80	P-08/P80	P-18/P10	P-08/P10
6.981E-01	2.215E 00	0.000	-4.406E-01	0.000	0.000	0.000	2.470E-02	5.770E 00	0.000	2.970E-03	0.000
5.070E 01	2.215E 00	0.000	-2.528E-02	0.000	0.000	0.000	4.564E 02	5.770E 00	0.000	2.970E-03	0.000
3.508E 01	3.959E 00	0.000	-5.529E-02	0.000	0.000	0.000	6.315E 02	5.770E 00	0.000	2.970E-03	0.000
3.525E 01	3.984E 00	5.657E 00	-5.233E-02	0.000	0.000	0.000	6.342E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.526E 01	3.994E 00	5.664E 00	-5.233E-02	0.000	0.000	0.000	6.342E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.535E 01	4.040E 00	6.011E 00	-5.263E-02	0.000	0.000	0.000	6.685E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.606E 01	3.970E 00	6.622E 00	-5.317E-02	1.501E 02	1.501E 02	0.000	7.204E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.648E 01	4.196E 00	7.126E 00	-5.372E-02	1.538E 02	1.538E 02	0.000	7.204E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.701E 01	4.145E 00	7.761E 00	-5.519E-02	2.324E 02	2.324E 02	0.000	8.200E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.739E 01	4.367E 00	8.212E 00	-5.648E-02	2.602E 02	2.602E 02	1.001E 02	8.200E 02	1.039E 01	1.474E 01	5.349E-03	1.474E 01
3.792E 01	4.678E 00	1.175E 01	-5.838E-02	3.125E 02	3.125E 02	1.451E 02	9.102E 02	1.219E 01	1.636E 01	6.273E-03	1.636E 01
3.803E 01	4.745E 00	1.167E 01	-5.861E-02	3.245E 02	3.245E 02	1.539E 02	9.102E 02	1.219E 01	1.636E 01	6.273E-03	1.636E 01
3.841E 01	4.296E 00	1.142E 01	-5.954E-02	3.551E 02	3.551E 02	1.827E 02	9.102E 02	1.219E 01	1.636E 01	6.273E-03	1.636E 01
3.875E 01	4.710E 00	1.427E 01	-6.044E-02	3.650E 02	3.650E 02	2.088E 02	1.012E 03	2.008E 01	2.568E 01	1.034E-02	2.568E 01
3.875E 01	4.710E 00	1.427E 01	-6.044E-02	3.650E 02	3.650E 02	2.088E 02	1.012E 03	2.008E 01	2.568E 01	1.034E-02	2.568E 01
3.901E 01	4.780E 00	1.535E 01	-6.055E-02	4.076E 02	4.076E 02	2.285E 02	1.041E 03	2.287E 01	3.942E 01	1.177E-02	3.942E 01
3.939E 01	1.531E 01	1.541E 01	-6.152E-02	4.403E 02	4.403E 02	2.568E 02	1.085E 03	3.989E 01	4.015E 01	2.053E-02	4.015E 01
3.950E 01	1.727E 01	1.460E 01	-6.205E-02	4.501E 02	4.501E 02	2.652E 02	1.098E 03	4.500E 01	4.500E 01	2.316E-02	4.500E 01
3.986E 01	1.801E 01	1.190E 01	-6.401E-02	4.822E 02	4.822E 02	2.928E 02	1.142E 03	4.892E 01	5.100E 01	2.415E-02	5.100E 01
4.000E 01	1.825E 01	1.659E 01	-6.480E-02	4.926E 02	4.926E 02	3.014E 02	1.156E 03	4.754E 01	5.444E 01	2.447E-02	5.444E 01
4.038E 01	1.566E 01	3.255E 01	-6.750E-02	5.234E 02	5.234E 02	3.277E 02	1.204E 03	4.132E 01	6.444E 01	2.127E-02	6.444E 01
4.090E 01	1.571E 01	3.585E 01	-6.771E-02	5.259E 02	5.259E 02	3.293E 02	1.203E 03	4.093E 01	6.444E 01	2.107E-02	6.444E 01
4.041E 01	1.565E 01	3.568E 01	-6.778E-02	5.267E 02	5.267E 02	3.300E 02	1.204E 03	4.093E 01	6.444E 01	2.107E-02	6.444E 01
4.037E 01	1.551E 01	1.920E 00	-6.732E-02	5.649E 02	5.649E 02	3.414E 02	1.181E 03	4.488E 01	6.444E 01	2.097E-02	6.444E 01
4.044E 01	1.539E 00	1.809E 00	-6.739E-02	5.638E 02	5.638E 02	3.421E 02	1.182E 03	4.488E 01	6.444E 01	2.097E-02	6.444E 01
4.050E 01	1.673E 00	2.069E 01	-6.732E-02	5.619E 02	5.619E 02	3.421E 02	1.182E 03	4.488E 01	6.444E 01	2.097E-02	6.444E 01
4.046E 01	1.627E 01	2.017E 01	-6.737E-02	5.619E 02	5.619E 02	3.421E 02	1.182E 03	4.488E 01	6.444E 01	2.097E-02	6.444E 01
4.046E 01	1.753E 01	1.299E 01	-6.117E-02	5.749E 02	5.749E 02	3.506E 02	1.144E 03	4.560E 01	6.444E 01	2.130E-02	6.444E 01
4.031E 01	1.600E 01	1.270E 01	-6.234E-02	5.942E 02	5.942E 02	3.723E 02	1.172E 03	4.560E 01	6.444E 01	2.130E-02	6.444E 01
4.080E 01	1.600E 01	1.201E 01	-6.234E-02	5.942E 02	5.942E 02	3.723E 02	1.172E 03	4.560E 01	6.444E 01	2.130E-02	6.444E 01
4.087E 01	1.789E 01	1.190E 01	-6.248E-02	5.965E 02	5.965E 02	3.751E 02	1.174E 03	4.661E 01	6.444E 01	2.130E-02	6.444E 01
4.026E 01	1.561E 01	9.768E 00	-6.304E-02	6.119E 02	6.119E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
4.731E 01	1.923E 01	8.158E 00	-6.304E-02	6.119E 02	6.119E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
4.702E 01	1.360E 01	8.025E 00	-6.296E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
4.811E 01	1.624E 01	8.782E 00	-6.161E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
4.805E 01	1.564E 00	9.563E 00	-7.840E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
4.938E 01	1.012E 01	1.012E 01	-7.568E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.289E 01	5.712E 00	5.252E 00	-6.129E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.339E 01	5.250E 00	5.250E 00	-5.990E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.414E 01	4.769E 00	4.769E 00	-5.790E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.490E 01	4.275E 00	4.275E 00	-5.621E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.576E 01	3.588E 00	3.588E 00	-5.450E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.622E 01	3.141E 00	3.141E 00	-5.079E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.658E 01	1.687E 00	3.096E 00	-5.071E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.652E 01	1.687E 00	2.986E 00	-5.051E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.600E 01	2.923E 00	2.923E 00	-5.039E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.688E 01	2.700E 00	2.700E 00	-5.002E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.710E 01	2.769E 00	2.769E 00	-4.976E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
5.805E 01	3.300E 00	3.300E 00	-4.823E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.006E 01	2.175E 00	2.175E 00	-4.817E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.288E 01	1.356E 00	1.356E 00	-4.817E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.474E 01	3.355E 00	3.455E 00	-4.817E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.512E 01	4.200E 00	3.776E 00	-4.817E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.516E 01	4.200E 00	3.610E 00	-4.817E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.566E 01	3.813E 00	3.980E 00	-4.817E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01
6.702E 01	1.530E 00	2.530E 00	-4.464E-02	6.104E 02	6.104E 02	3.808E 02	1.181E 03	4.111E 01	6.444E 01	2.120E-02	6.444E 01

XARS	P1M	P=00	PRA	Q01	Q=10	Q=00	L=ALI	P=1M/P=0	P=1M/P10	P=0B/P=0	P=0B/P10
6.769E 01	1.480E 00	3.000E 00	-4.023E 02	-1.050E 03	-6.694E 02	-3.000E 02	4.610E 03	4.384E 00	2.258E-03	4.372E 00	4.827E-03
6.840E 01	1.860E 00	2.630E 00	-3.359E 02	-1.055E 03	-6.601E 02	-3.764E 02	4.711E 03	4.808E 00	2.494E-03	7.372E 00	3.795E-03
6.918E 01	1.530E 00	2.110E 00	-2.826E 02	-1.050E 03	-6.660E 02	-3.691E 02	4.747E 03	3.985E 00	2.021E-03	5.447E 00	2.829E-03
6.979E 01	1.250E 00	1.800E 00	-2.067E 02	-1.080E 03	-6.950E 02	-3.913E 02	4.873E 03	3.256E 00	1.676E-03	4.794E 00	2.408E-03
7.074E 01	1.085E 00	1.420E 00	-2.024E 02	-1.173E 03	-7.039E 02	-4.690E 02	4.987E 03	2.686E 00	1.555E-03	3.694E 00	1.904E-03
7.117E 01	1.010E 00	1.372E 00	-1.857E 02	-1.212E 03	-7.075E 02	-5.049E 02	5.039E 03	2.631E 00	1.354E-03	3.574E 00	1.839E-03
7.270E 01	9.693E-01	1.200E 00	-1.320E 02	-1.314E 03	-7.169E 02	-6.552E 02	5.229E 03	2.525E 00	1.300E-03	3.126E 00	1.609E-03
7.360E 01	9.454E-01	4.200E-01	-9.866E 01	-1.514E 03	-7.246E 02	-7.696E 02	5.323E 03	2.403E 00	1.266E-03	1.094E 00	5.832E-04
7.360E 01	9.453E-01	4.165E-01	-7.783E 01	-1.515E 03	-7.246E 02	-7.696E 02	5.324E 03	2.403E 00	1.266E-03	1.094E 00	5.832E-04
7.493E 01	9.100E-01	0.000	-7.623E 01	-1.704E 03	-7.322E 02	-1.051E 03	5.375E 03	2.311E 00	1.220E-03	1.085E 00	5.585E-04
7.778E 01	5.000E-01	0.000	-5.004E 01	-1.747E 03	-7.455E 02	-1.051E 03	5.474E 03	1.303E 00	6.705E-04	0.000	0.000
8.168E 01	4.700E-01	0.000	-2.931E 01	-1.611E 03	-7.594E 02	-1.051E 03	5.579E 03	1.224E 00	6.302E-04	0.000	0.000
8.449E 01	5.100E-01	0.000	-1.842E 01	-1.624E 03	-7.721E 02	-1.051E 03	5.633E 03	1.354E 00	6.839E-04	0.000	0.000
8.735E 01	8.350E-01	0.000	-2.193E 00	-1.640E 03	-7.946E 02	-1.051E 03	5.656E 03	2.175E 00	1.120E-03	0.000	0.000
8.735E 01	8.357E-01	0.000	-2.188E 00	-1.640E 03	-7.946E 02	-1.051E 03	5.656E 03	2.177E 00	1.121E-03	0.000	0.000

READING = 0034 BLOCK = 75 TIME = 98.152 MAGN 6.0 PI = 745.744 TI = 2465.5

X	DDRG	CURAG	CF	MC
4.004E 01	1.288E 02	1.288E 02	2.287E+03	4.554E-02
4.004E 01	1.768E-01	1.290E 02	2.288E+03	4.555E-02
4.137E 01	1.705E 01	1.460E 02	2.361E+03	4.746E-02
4.144E 01	1.161E 00	1.472E 02	2.364E+03	4.754E-02
4.150E 01	1.133E 00	1.483E 02	2.367E+03	4.764E-02
4.246E 01	1.759E 01	1.659E 02	2.389E+03	5.254E-02
4.416E 01	3.100E 01	1.969E 02	2.442E+03	5.940E-02
4.431E 01	2.705E 00	1.996E 02	2.445E+03	5.975E-02
4.480E 01	8.682E 00	2.083E 02	2.459E+03	5.920E-02
4.487E 01	1.271E 00	2.096E 02	2.459E+03	5.920E-02
4.626E 01	2.417E 01	2.337E 02	2.483E+03	5.419E-02
4.731E 01	1.748E 01	2.512E 02	2.506E+03	5.050E-02
4.740E 01	1.363E 00	2.526E 02	2.504E+03	4.970E-02
4.811E 01	1.161E 01	2.638E 02	2.507E+03	2.664E-02
4.845E 01	1.074E 01	2.745E 02	2.491E+03	2.603E-02
4.936E 01	7.056E 00	2.816E 02	2.471E+03	2.601E-02
5.004E 01	3.885E 01	3.601E 02	2.571E+03	1.601E-02
5.339E 01	4.496E 00	3.245E 02	2.361E+03	1.541E-02
5.414E 01	6.430E 00	3.310E 02	2.348E+03	1.418E-02
5.490E 01	6.189E 00	3.372E 02	2.342E+03	1.242E-02
5.576E 01	6.688E 00	3.439E 02	2.332E+03	1.141E-02
5.632E 01	2.582E 00	3.464E 02	2.284E+03	9.678E-03
5.638E 01	3.304E-01	3.466E 02	2.305E+03	7.645E-03
5.652E 01	8.397E-01	3.476E 02	2.297E+03	7.710E-03
5.660E 01	4.767E-01	3.481E 02	2.277E+03	9.151E-03
5.688E 01	1.662E 00	3.498E 02	2.279E+03	8.542E-03
5.710E 01	1.341E 00	3.511E 02	2.271E+03	8.753E-03
5.885E 01	1.014E 01	3.612E 02	2.256E+03	9.912E-03
6.089E 01	1.188E 01	3.731E 02	2.281E+03	7.202E-03
6.228E 01	9.059E 00	3.822E 02	2.367E+03	4.968E-03
6.474E 01	1.588E 01	3.974E 02	2.303E+03	1.016E-02
6.512E 01	2.059E 00	3.995E 02	2.342E+03	1.121E-02
6.516E 01	2.030E-01	3.997E 02	2.355E+03	1.148E-02
6.536E 01	9.487E-01	4.007E 02	2.352E+03	1.115E-02
6.702E 01	9.500E 00	4.072E 02	2.216E+03	9.519E-03
6.769E 01	2.152E 00	4.093E 02	2.269E+03	8.245E-03
6.846E 01	2.640E 00	4.120E 02	2.243E+03	7.525E-03
6.916E 01	2.188E 00	4.142E 02	2.195E+03	6.203E-03
6.979E 01	1.604E 00	4.158E 02	2.164E+03	5.472E-03
7.074E 01	2.194E 00	4.180E 02	2.123E+03	4.653E-03
7.117E 01	9.134E-01	4.189E 02	2.113E+03	4.474E-03
7.270E 01	1.380E 00	4.220E 02	2.090E+03	4.153E-03
7.360E 01	1.389E-03	4.233E 02	2.009E+03	2.909E-03
7.493E 01	6.759E-01	4.240E 02	2.052E+03	5.615E-03
7.776E 01	1.186E 00	4.252E 02	1.943E+03	4.273E-03
8.168E 01	9.651E-01	4.261E 02	1.920E+03	2.152E-03
8.449E 01	5.023E-01	4.266E 02	1.923E+03	2.279E-03
8.735E 01	2.503E-01	4.269E 02	1.994E+03	3.508E-03
9.735E 01	0.000	4.269E 02	1.994E+03	5.511E-03

## RAJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST.....-339. (LBF)  
 MEASURED THRUST.....62. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... (LBF-SEC/LBF)  
 MEASURED SPECIFIC IMPULSE.....42144. (LBF-SEC/LBF)  
 CALCULATED THRUST COEFFICIENT.....0.1769  
 MEASURED THRUST COEFFICIENT.....0.0248

## REGENERATIVE-COOLED ENGINE PERFORMANCE

## CALCULATED

STREAM THRUST.....4681. (LBF)  
 NET THRUST.....2332. (LBF)  
 SPECIFIC IMPULSE..... (LBF-SEC/LBF)  
 THRUST COEFFICIENT.....0.1339

## MOMENTUM AND FORCES

INLET FRICTION DRAG.....125.8 (LBF)  
 INLET MOMENTUM CHANGE.....-805.9 (LBF)  
 COMBUSTOR FRICTION DRAG.....274.4 (LBF)  
 COMBUSTOR STREAM DRAG.....9.60 (LBF)  
 COMBUSTOR MOMENTUM CHANGE.....-25. (LBF)  
 NOZZLE FRICTION DRAG.....27.34 (LBF)  
 NOZZLE STREAM DRAG.....0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE.....492. (LBF)  
 NOZZLE PRESSURE INTEGRAL.....479. (LBF)  
 EXTERNAL FRICTION DRAG.....66.90 (LBF)  
 EXTERNAL PRESSURE INTEGRAL.....-988. (LBF)  
 TOTAL EXTERNAL DRAG.....-105. (LBF)  
 CAVITY FORCE.....-1392. (LBF)  
 CALCULATED LOAD CELL FORCE.....-2866. (LBF)  
 MEASURED LOAD CELL FORCE.....-2365. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## STATIONS

NOMINAL CONVL LEADING EDGE.....34.884 (IN)  
 SPIKE TRANSLATION.....0.3767 (IN)  
 INLET THROAT.....40.400 (IN)  
 CONVL LEADING EDGE.....35.261 (IN)  
 NOZZLE SHROUD TRAILING EDGE.....73.601 (IN)  
 NOZZLE PLUG TRAILING EDGE.....67.353 (IN)  
 STRUT LEADING EDGE.....56.511 (IN)  
 STRUT TRAILING EDGE.....65.111 (IN)  
 COMBUSTOR EXIT.....65.111 (IN)

## INLET

ANGLE OF ATTACK.....0.000 (DEGREES)  
 MASS FLOW RATIO.....0.9627  
 ADDITIVE DRAG COEFFICIENT.....0.0002  
 LIFTING PRESSURE RECOVERY EFFICIENCY.....0.1590  
 DELTA P12.....0.1213 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC.....0.3350  
 TOTAL PRESSURE RECOVERY = SUBSONIC.....0.1614  
 INLET PROCESS EFFICIENCY = SUPERSONIC.....0.8873  
 INLET PROCESS EFFICIENCY = SUBSONIC.....0.9046  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC.....0.9265  
 KINETIC ENERGY EFFICIENCY = SUBSONIC.....0.8831  
 ENTHALPY AT P0 = SUPERSONIC.....-1.76 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC.....26.27 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO.....0.0001  
 EQUIVALENCE RATIO.....0.002  
 COMBUSTOR EFFICIENCY.....0.349  
 TOTAL PRESSURE RATIO.....0.2452  
 COMBUSTOR EFFECTIVENESS.....0.7307  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM IMPUSET COEFFICIENT = C9.....0.9864  
 NOZZLE COEFFICIENT = C1.....0.9417  
 PROCESS EFFICIENCY.....1.0844  
 KINETIC ENERGY EFFICIENCY.....0.9716

## FUEL INJECTIONS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.362	
1C	44.300	
2A	48.837	
2C	46.250	
3A	54.127	
3B	56.312	
4	44.862	

Reading 34

$t = 104.45 \text{ sec.}$

12/23/74

READING # 0034 BLOCK # 62 TIME # 104.452 MACH 0.0 PI # 748.249 TT # 2889.7  
RAMJET PERFORMANCE

SUMMARY REPORT

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WIND TUNNEL		P	T	H	GAMMA	MOLNT	SONV	MACH	VEL	S	M/A	A/C	MUHL	B	JVAC	PHI	ETAC
0.000	748.249	2990	666.2(	791)	1.2930	28.972	2576										
0.000	0.389	405	31.7(	97)	1.3089	28.971	986	3.993	5910	1.826	0.10632	26.642	0.9784	4991	9.764	187.1	
SPIKE TIP NS		2	0	4													
0.000	18.112	2990	666.2(	791)	1.2929	28.971	2575										
0.000	15.314	2522	645.8(	771)	1.2950	28.971	2548	0.397	1012	2.081	0.10632	26.642	0.9784	4941	1.672	185.5	
WIND TUNNEL		3	0	0													
0.000	748.249	2990	666.2(	791)	1.2930	28.972	2576										
0.000	0.382	403	32.1(	97)	1.3089	28.971	984	6.010	5912	1.826	0.10502	26.316	0.9784	4931	9.648	187.4	
SPIKE TIP NS		4	0	0													
0.000	18.112	2990	666.2(	791)	1.2929	28.971	2575										
0.000	15.422	2524	646.4(	772)	1.2950	28.971	2549	0.391	997	2.081	0.10502	26.316	0.9784	4931	1.628	187.6	
INLET THROAT		5	0	3													
40.400	317.802	2771	600.6(	727)	1.2999	28.972	2486										
40.400	14.362	1287	186.1(	315)	1.3605	28.971	1733	2.628	4554	1.862	0.95317	26.642	0.1091	4173	67.459	156.6	
INLET UPWASK		6	0	3													
40.400	317.802	2771	600.6(	727)	1.2999	28.972	2486										
40.400	12.351	1236	173.0(	302)	1.3636	28.971	1701	2.720	4625	1.862	0.86652	26.642	0.1200	4210	62.284	158.0	
INLET DOWNWASK		7	0	4													
40.400	122.026	2771	600.6(	727)	1.3000	28.972	2486										
40.400	109.236	2677	572.9(	700)	1.3029	28.972	2447	0.480	1176	1.928	0.86652	26.642	0.1200	4210	15.832	158.0	
COMBUSTOR		8	1	21													
40.410	272.161	2736	601.0(	746)	1.3022	27.813	2524										
40.410	13.879	1306	186.6(	333)	1.3602	27.813	1782	2.555	4554	1.935	0.93615	26.729	0.1091	4171	67.668	156.1	0.10 0.07
COMBUSTOR		9	2	21													
40.411	288.271	2700	601.0(	735)	1.3038	27.774	2510										
40.411	13.877	1266	186.6(	323)	1.3630	27.773	1758	2.591	4554	1.927	0.93651	26.729	0.1091	4171	67.691	156.0	0.10 0.01
COMBUSTOR		10	3	21													
41.296	189.595	2623	589.4(	742)	1.3076	26.613	2531										
41.296	19.219	1888	245.6(	399)	1.3513	26.613	1938	2.140	4146	2.016	0.95881	26.624	0.1092	3996	61.804	149.0	0.20 0.04
COMBUSTOR		11	4	21													
41.406	197.953	2584	589.3(	720)	1.3093	26.573	2516										
41.406	19.273	1448	246.0(	386)	1.3539	26.573	1915	2.164	4144	2.009	0.96002	26.624	0.1091	3994	61.833	148.9	0.20 0.01
COMBUSTOR		12	5	21													
41.471	193.365	2575	588.1(	727)	1.3097	26.568	2512										
41.471	19.323	1453	249.5(	390)	1.3536	26.567	1919	2.145	4116	2.009	0.95934	26.624	0.1092	3981	61.371	148.4	0.20 0.00
COMBUSTOR		13	6	2													
41.500	192.953	2578	587.6(	728)	1.3096	26.572	2513										
41.500	19.288	1468	252.1(	394)	1.3528	26.572	1927	2.126	4097	2.010	0.95941	26.624	0.1092	3975	61.088	148.2	0.20 0.00
COMBUSTOR		14	7	4													
42.460	131.315	2713	567.7(	768)	1.3026	26.770	2562										
42.460	29.895	1887	312.7(	515)	1.3313	26.770	2160	1.694	3572	2.051	0.95406	26.912	0.1101	3809	52.959	141.5	0.20 0.18
COMBUSTOR		15	8	4													
44.191	103.373	2796	536.3(	791)	1.2975	26.965	2586										
44.191	37.395	2191	346.7(	604)	1.3161	26.965	2307	1.335	3080	2.071	0.91742	26.912	0.1145	3673	43.914	136.5	0.20 0.34
COMBUSTOR		16	9	2													
44.310	105.143	2787	534.1(	789)	1.2978	26.963	2583										
44.310	37.168	2182	344.5(	601)	1.3164	26.963	2303	1.338	3081	2.070	0.91569	26.912	0.1147	3669	43.837	136.3	0.20 0.34
COMBUSTOR		17	10	3													
44.600	104.770	2745	525.2(	776)	1.2994	26.947	2566										
44.600	36.224	2135	334.9(	587)	1.3202	26.948	2281	1.353	3086	2.066	0.91289	26.912	0.1151	3649	43.779	135.6	0.20 0.32
COMBUSTOR		18	11	2													
44.906	104.738	2735	523.3(	773)	1.2998	26.943	2561										
44.906	35.897	2123	332.3(	583)	1.3208	26.943	2274	1.359	3091	2.065	0.91155	26.912	0.1153	3646	43.794	135.5	0.20 0.32



ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0034 BLOCK = 82 TIME = 104.452 MACH 0.0 P1 = 748.249 T1 = 2989.7

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	M/A	"	A/C	MUMIN	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	3													
46.260	101.529	2693	514.3	(760)	1.3016	26.411	2545										
46.260	31.694	2041	316.9	(559)	1.3241	26.911	2234	1.425	3183	2.064	0.86063	26.912	0.1221	3653	42.576	135.7	0.20 0.29
COMBUSTOR	0	20	13	3													
47.310	97.427	2720	532.4	(768)	1.3009	26.896	2557										
47.310	28.435	2027	317.5	(555)	1.3247	26.896	2228	1.472	3279	2.070	0.80045	26.912	0.1313	3699	40.790	137.4	0.20 0.28
COMBUSTOR	0	21	14	2													
47.431	97.233	2719	533.9	(768)	1.3010	26.890	2557										
47.431	27.952	2019	316.7	(553)	1.3251	26.890	2224	1.482	3296	2.070	0.79396	26.912	0.1323	3705	40.669	137.7	0.20 0.28
COMBUSTOR	0	22	15	3													
48.110	96.736	2709	542.2	(766)	1.3017	26.851	2555										
48.110	24.236	1944	305.6	(531)	1.3263	26.851	2187	1.573	3440	2.071	0.74526	26.912	0.1410	3753	39.847	139.5	0.20 0.28
COMBUSTOR	0	23	16	3													
48.681	93.603	2755	551.3	(780)	1.3000	26.870	2574										
48.681	20.957	1924	295.4	(526)	1.3287	26.870	2177	1.643	3578	2.079	0.67614	26.912	0.1554	3827	37.594	142.2	0.20 0.28
COMBUSTOR	0	24	17	3													
49.411	92.035	2757	557.3	(781)	1.3001	26.852	2576										
49.411	18.487	1875	284.9	(510)	1.3309	26.852	2150	1.717	3692	2.080	0.63235	26.912	0.1662	3875	36.279	144.0	0.20 0.25
COMBUSTOR	0	25	18	5													
52.921	92.052	2668	569.4	(759)	1.3055	26.535	2555										
52.921	9.300	1513	236.9	(408)	1.3495	26.535	1956	2.147	4200	2.082	0.44336	27.012	0.2379	4093	26.936	151.5	0.21 0.08
COMBUSTOR	0	26	19	4													
53.421	83.184	2765	593.6	(788)	1.3012	26.622	2592										
53.421	9.712	1618	247.1	(444)	1.3423	26.622	2027	2.055	4164	2.100	0.42524	27.012	0.2480	4113	27.518	152.3	0.21 0.15
COMBUSTOR	0	27	20	3													
54.171	77.310	2829	599.7	(808)	1.2985	26.671	2617										
54.171	9.470	1703	251.2	(462)	1.3398	26.671	2061	2.026	4176	2.111	0.40085	27.012	0.2631	4184	28.011	153.4	0.21 0.19
COMBUSTOR	0	28	21	3													
54.931	72.331	2891	605.4	(827)	1.2958	26.718	2640										
54.931	9.228	1762	254.8	(479)	1.3327	26.718	2093	2.001	4189	2.122	0.37904	27.012	0.2782	4174	29.674	154.5	0.21 0.23
COMBUSTOR	0	29	22	3													
55.760	71.126	2897	611.1	(829)	1.2958	26.705	2643										
55.760	6.471	1736	250.7	(471)	1.3370	26.706	2079	2.043	4247	2.124	0.35815	27.012	0.2945	4204	23.637	155.6	0.21 0.22
COMBUSTOR	0	30	23	4													
56.356	52.033	3157	615.0	(908)	1.2833	26.976	2732										
56.356	7.430	2037	259.6	(558)	1.3223	26.979	2228	1.893	4217	2.166	0.28663	27.012	0.3679	4288	18.786	158.7	0.21 0.43
COMBUSTOR	0	31	24	5													
56.411	68.426	2854	615.4	(816)	1.2979	26.646	2629										
56.411	5.834	1567	219.1	(423)	1.3457	26.646	1984	2.245	4453	2.124	0.28587	27.012	0.3689	4240	14.784	158.8	0.21 0.17
COMBUSTOR	0	32	25	2													
56.531	68.327	2856	616.3	(817)	1.2979	26.644	2630										
56.531	5.770	1564	218.6	(422)	1.3458	26.644	1982	2.251	4461	2.124	0.28377	27.012	0.3717	4294	14.671	159.0	0.21 0.17
COMBUSTOR	0	33	26	5													
56.631	53.720	3130	616.8	(900)	1.2848	26.942	2724										
56.631	7.680	1986	254.6	(543)	1.3246	26.944	2203	1.932	4257	2.162	0.28705	27.012	0.3674	4297	18.990	159.1	0.21 0.40
COMBUSTOR	0	34	27	3													
56.911	55.069	3106	616.5	(893)	1.2860	26.910	2717										
56.911	7.425	1940	250.4	(530)	1.3267	26.911	2181	1.968	4291	2.159	0.28605	27.012	0.3687	4304	19.077	159.3	0.21 0.38
COMBUSTOR	0	35	28	3													
57.137	56.280	3086	619.8	(887)	1.2871	26.882	2710										
57.137	7.227	1902	247.1	(519)	1.3284	26.883	2161	1.998	4318	2.156	0.28551	27.012	0.3694	4309	19.160	159.5	0.21 0.35
COMBUSTOR	0	36	29	5													
58.881	60.117	2892	628.9	(828)	1.2967	26.642	2646										
58.881	5.700	1583	224.7	(427)	1.3449	26.642	1993	2.256	4497	2.129	0.27924	27.012	0.3777	4327	19.515	160.2	0.21 0.17
COMBUSTOR	0	37	30	4													
60.891	62.291	2983	636.4	(856)	1.2927	26.715	2679										
60.891	6.625	1743	250.0	(474)	1.3366	26.715	2082	2.112	4398	2.145	0.28896	27.012	0.3650	4311	19.748	159.6	0.21 0.22

READING = 0034 BLOCK = 82 DE = 108.452 MAGM 6.0 PT = 748.249 TT = 2989.7

COMBUSTOR	P	T	M	GAMMA	MOL%T	SONV	MAGM	VEL	S	W/A	N	A/AC	MUMIN	G	IVAL	PHI	ETAC
62.311	68.291 28.8	640.0( 830)	1.2969	26.611	2650												
62.311	68.319 1626	248.7( 440)	1.3430	26.612	2020	2.196	4436	2.130	0.29679	27.012	0.3553	4299	20.460	158.2	0.21	0.14	
COMBUSTOR	0 39	32 5															
64.775	45.819 3300	644.6( 954)	1.2772	27.039	2784												
64.775	45.992 2276	315.6( 630)	1.3130	27.043	2344	1.736	4068	2.180	0.26132	27.012	0.31744	4279	17.766	156.4	0.21	0.48	
COMBUSTOR	0 40	35 4															
65.151	38.509 3502	645.3(1016)	1.2659	27.270	2843												
65.151	9.950 2598	346.1( 723)	1.2991	27.277	2480	1.560	3869	2.212	0.46154	27.012	0.4032	4276	15.726	156.3	0.21	0.65	
COMBUSTOR	41	34 3															
65.151	38.509 3515	649.7(1020)	1.2654	27.269	2848												
65.151	9.992 2611	350.1( 731)	1.2967	27.277	2486	1.557	3872	2.213	0.46154	27.012	0.4032	4263	15.756	156.5	0.21	0.65	
NOZZLE	42	35 4															
67.387	38.509 3502	645.3(1015)	1.2659	27.270	2843												
67.387	0.732 1371	21.1( 361)	1.3508	27.276	1836	3.143	5775	2.212	0.05444	27.012	1.9371	5212	4.884	192.9	0.21	0.65	
NOZZLE	43	36 4															
67.387	38.509 3502	645.3(1015)	1.2659	27.270	2843												
67.387	0.384 1161	79.4( 303)	1.3638	27.278	1699	3.545	6022	2.212	0.03560	27.012	2.9625	5351	3.132	198.1	0.21	0.65	
NOZZLE	44	37 4															
67.387	38.509 3515	649.7(1020)	1.2654	27.269	2848												
67.387	0.732 1379	19.0( 363)	1.3504	27.278	1842	3.140	5765	2.213	0.05444	27.012	1.9371	5221	4.894	193.1	0.21	0.65	
NOZZLE	45	38 4															
67.387	38.509 3515	649.7(1020)	1.2654	27.269	2848												
67.387	0.389 1166	78.0( 304)	1.3634	27.276	1702	3.545	6034	2.213	0.03551	27.012	2.9701	5362	3.330	198.5	0.21	0.65	
FICTIVE	COMBUSTOR	64	57 0														
65.151	317.602 3887	645.3(1135)	1.2500	27.132	2951												
65.151	0.489 762	215.3( 194)	1.3632	27.747	1374	5.046	6934	2.074	0.06353	27.012	1.6600	5987	6.846	221.6	0.21	1.00	
FICTIVE	NOZZLE	65	58 0														
67.387	54.680 3188	537.7( 914)	1.2787	27.275	2726												
67.387	0.559 1034	113.6( 268)	1.3716	27.276	1606	3.551	5709	2.154	0.05444	27.012	1.9471	5071	4.831	187.7	0.21	0.65	

XABS	P-1B	P-0B	PDA	QUX	U-1B	G-0B	CANALL	P-1B/P80	P-1B/P10	P-QB/P80	P-QB/P10	P-0B/P10	P-0B/P10
6.961E-01	2.225E 00	0.000	4.414E-01	0.000	0.000	0.000	2.470E-02	5.724E 00	2.974E-03	0.000	0.000	0.000	0.000
6.970E 01	2.225E 00	0.000	-2.540E 02	0.000	0.000	0.000	4.564E 02	5.724E 00	2.974E-03	0.000	0.000	0.000	0.000
3.508E 01	3.970E 00	0.000	-4.547E 02	0.000	0.000	0.000	6.315E 02	1.021E 01	5.306E-03	0.000	0.000	0.000	0.000
3.529E 01	4.012E 00	5.728E 00	-5.285E 02	0.000	0.000	0.000	6.410E 02	1.032E 01	5.326E-03	1.474E 01	7.655E-03	0.000	0.000
3.529E 01	4.013E 00	5.735E 00	-5.286E 02	0.000	0.000	0.000	6.410E 02	1.032E 01	5.326E-03	1.474E 01	7.655E-03	0.000	0.000
3.555E 01	4.065E 00	6.016E 00	-5.311E 02	0.000	0.000	0.000	6.666E 02	1.048E 01	5.433E-03	1.548E 01	8.000E-03	0.000	0.000
3.606E 01	4.395E 00	6.577E 00	-5.366E 02	-2.781E 02	-2.888E 02	0.000	7.185E 02	1.025E 01	5.326E-03	1.692E 01	8.700E-03	0.000	0.000
3.648E 01	4.160E 00	7.040E 00	-5.420E 02	-2.848E 02	-2.937E 02	0.000	7.621E 02	1.080E 01	5.612E-03	1.811E 01	9.408E-03	0.000	0.000
3.701E 01	4.160E 00	7.040E 00	-5.420E 02	-2.848E 02	-2.937E 02	0.000	7.621E 02	1.080E 01	5.612E-03	1.811E 01	9.408E-03	0.000	0.000
3.742E 01	4.430E 00	8.075E 00	-5.718E 02	-3.009E 02	-3.108E 02	0.000	8.621E 02	1.140E 01	5.920E-03	2.077E 01	1.074E-02	0.000	0.000
3.742E 01	4.430E 00	8.075E 00	-5.718E 02	-3.009E 02	-3.108E 02	0.000	8.621E 02	1.140E 01	5.920E-03	2.077E 01	1.074E-02	0.000	0.000
3.803E 01	4.830E 00	1.177E 00	-5.915E 02	-3.108E 02	-3.207E 02	0.000	9.208E 02	1.239E 01	6.185E-03	3.029E 01	1.574E-02	0.000	0.000
3.803E 01	4.830E 00	1.177E 00	-5.915E 02	-3.108E 02	-3.207E 02	0.000	9.208E 02	1.239E 01	6.185E-03	3.029E 01	1.574E-02	0.000	0.000
3.844E 01	4.830E 00	1.177E 00	-5.915E 02	-3.108E 02	-3.207E 02	0.000	9.208E 02	1.239E 01	6.185E-03	3.029E 01	1.574E-02	0.000	0.000
3.844E 01	4.830E 00	1.177E 00	-5.915E 02	-3.108E 02	-3.207E 02	0.000	9.208E 02	1.239E 01	6.185E-03	3.029E 01	1.574E-02	0.000	0.000
3.875E 01	4.502E 00	1.378E 01	-6.043E 02	-3.203E 03	-3.263E 02	0.000	9.746E 02	1.693E 01	8.695E-03	2.875E 01	1.493E-02	0.000	0.000
3.891E 01	4.415E 00	1.507E 01	-6.152E 02	-3.256E 03	-3.297E 02	0.000	1.010E 03	1.997E 01	1.037E-02	3.536E 01	1.837E-02	0.000	0.000
3.901E 01	4.862E 00	1.594E 01	-6.155E 02	-3.241E 03	-3.318E 02	0.000	1.028E 03	2.155E 01	1.125E-02	3.878E 01	2.035E-02	0.000	0.000
3.942E 01	1.593E 01	1.594E 01	-6.271E 02	-3.440E 03	-3.407E 02	0.000	1.039E 03	2.269E 01	1.179E-02	3.996E 01	2.064E-02	0.000	0.000
3.950E 01	1.730E 01	1.508E 01	-6.308E 02	-3.457E 03	-3.455E 02	0.000	1.096E 03	4.451E 01	1.212E-02	3.879E 01	2.015E-02	0.000	0.000
3.991E 01	1.645E 01	1.352E 01	-6.511E 02	-3.593E 03	-3.520E 02	0.000	1.144E 03	4.706E 01	1.265E-02	3.402E 01	2.015E-02	0.000	0.000
4.000E 01	1.670E 01	1.352E 01	-6.557E 02	-3.642E									



READING = 0034 BLOCK = 82 TIME = 104.452 MACH 6.0 PT = 748.249 TT = 2989.7

X	UDRAG	CORAG	CF	HC
4.00E 01	1.294E 02	1.294E 02	2.102E+03	4.110E+02
4.041E 01	1.793E+01	1.296E 02	2.397E+03	3.803E+02
4.001E 01	1.634E+02	1.296E 02	2.397E+03	3.803E+02
4.140E 01	1.874E 02	1.484E 02	2.572E+03	4.811E+02
4.181E 01	1.784E+01	1.486E 02	2.364E+03	5.105E+02
4.147E 01	1.123E 00	1.497E 02	2.341E+03	5.200E+02
4.150E 01	5.046E+01	1.502E 02	2.343E+03	5.265E+02
4.246E 01	1.588E 01	1.661E 02	2.511E+03	6.360E+02
4.419E 01	2.660E 01	1.927E 02	2.732E+03	6.627E+02
4.431E 01	1.766E 00	1.984E 02	2.833E+03	6.353E+02
4.480E 01	7.409E 00	2.018E 02	2.824E+03	6.267E+02
4.481E 01	1.590E 00	2.034E 02	2.814E+03	6.255E+02
4.626E 01	2.014E 01	2.236E 02	2.791E+03	5.760E+02
4.731E 01	1.507E 01	2.386E 02	2.766E+03	5.340E+02
4.743E 01	1.878E 00	2.403E 02	2.755E+03	5.300E+02
4.811E 01	9.349E 00	2.997E 02	2.727E+03	4.835E+02
4.888E 01	1.007E 01	2.597E 02	2.669E+03	4.389E+02
4.981E 01	6.535E 00	2.683E 02	2.653E+03	4.002E+02
5.292E 01	3.776E 01	3.040E 02	2.564E+03	2.374E+02
5.342E 01	4.484E 00	3.085E 02	2.398E+03	2.534E+02
5.417E 01	6.235E 00	3.187E 02	2.464E+03	2.413E+02
5.493E 01	6.120E 00	3.209E 02	2.496E+03	2.316E+02
5.515E 01	6.455E 00	3.273E 02	2.518E+03	2.140E+02
5.636E 01	2.726E 00	3.300E 02	2.475E+03	1.936E+02
5.641E 01	3.459E+01	3.304E 02	2.617E+03	1.499E+02
5.655E 01	8.758E+01	3.313E 02	2.379E+03	1.586E+02
5.693E 01	5.117E+01	3.318E 02	2.793E+03	1.708E+02
5.691E 01	1.831E 00	3.336E 02	2.602E+03	1.769E+02
5.714E 01	1.427E 00	3.350E 02	2.576E+03	1.747E+02
5.888E 01	1.105E 01	3.461E 02	2.539E+03	1.482E+02
6.089E 01	1.252E 01	3.586E 02	2.407E+03	1.718E+02
6.231E 01	8.915E 00	3.675E 02	2.461E+03	1.639E+02
6.477E 01	1.503E 01	3.825E 02	2.511E+03	2.057E+02
6.519E 01	2.150E 00	3.847E 02	2.609E+03	1.967E+02
6.519E 01	2.389E+01	3.849E 02	2.958E+03	1.932E+02
6.539E 01	1.192E 00	3.861E 02	2.954E+03	1.917E+02
6.705E 01	9.178E 00	3.953E 02	2.639E+03	1.367E+02
6.772E 01	3.132E 00	3.984E 02	2.826E+03	1.340E+02
6.849E 01	3.361E 00	4.018E 02	2.774E+03	1.100E+02
6.921E 01	2.858E 00	4.047E 02	2.750E+03	1.012E+02
6.952E 01	2.254E 00	4.069E 02	2.724E+03	9.172E+01
7.077E 01	3.068E 00	4.100E 02	2.662E+03	7.164E+01
7.120E 01	1.216E 00	4.112E 02	2.637E+03	6.470E+01
7.213E 01	3.710E 00	4.149E 02	2.570E+03	4.950E+01
7.363E 01	1.503E 00	4.164E 02	2.462E+03	3.092E+01
7.363E 01	1.975E+03	4.164E 02	2.461E+03	3.093E+01
7.496E 01	6.735E+01	4.171E 02	2.488E+03	3.576E+01
7.781E 01	1.116E 00	4.182E 02	2.368E+03	2.185E+01
8.171E 01	1.047E 00	4.193E 02	2.401E+03	2.722E+01
8.482E 01	5.514E+01	4.198E 02	2.350E+03	2.260E+01
8.736E 01	2.231E+01	4.201E 02	2.426E+03	3.361E+01
8.739E 01	0.000	4.201E 02	2.426E+03	3.363E+01

ORIGINAL PAGE IS  
OF POOR QUALITY

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST.....	75. (LBF)	ANGLE OF ATTACK .....	0.000 (DEGREES)
MEASURED THRUST.....	825. (LBF)	MASS FLOW RATIO.....	0.9784
CALCULATED SPECIFIC IMPULSE.....	305. (LBF-SEC/LBM)	ADDITIONAL DRAG COEFFICIENT.....	0.0009
MEASURED SPECIFIC IMPULSE.....	4235. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1608
CALCULATED THRUST COEFFICIENT.....	0.0301	DELTA P12.....	0.1141 (PSI)
MEASURED THRUST COEFFICIENT.....	0.3309	TOTAL PRESSURE RECOVERY = SUPERSONIC.....	0.4242
		TOTAL PRESSURE RECOVERY = SUBSONIC.....	0.1631
		INLET PROCESS EFFICIENCY = SUPERSONIC.....	0.9279
		INLET PROCESS EFFICIENCY = SUBSONIC.....	0.9153
		KINETIC ENERGY EFFICIENCY = SUPERSONIC.....	0.8834
		KINETIC ENERGY EFFICIENCY = SUBSONIC.....	0.8325
		ENTHALPY AT P0 = SUPERSONIC.....	15.96 (BTU/LBM)
		ENTHALPY AT P0 = SUBSONIC.....	19.54 (BTU/LBM)

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

STREAM THRUST.....	5080. (LBF)
NET THRUST.....	85. (LBF)
SPECIFIC IMPULSE.....	435. (LBF-SEC/LBM)
THRUST COEFFICIENT.....	0.0339

MOMENTUM AND FORCES

INLET FRICTION DRAG.....	129.4 (LBF)
INLET MOMENTUM CHANGE.....	-822.8 (LBF)
COMBUSTOR FRICTION DRAG.....	255.2 (LBF)
COMBUSTOR STRUT DRAG.....	18.82 (LBF)
COMBUSTOR MOMENTUM CHANGE.....	103. (LBF)
NOZZLE FRICTION DRAG.....	35.19 (LBF)
NOZZLE STRUT DRAG.....	0.00 (LBF)
NOZZLE MOMENTUM CHANGE.....	795. (LBF)
NOZZLE PRESSURE INTEGRAL.....	830. (LBF)
EXTERNAL FRICTION DRAG.....	68.03 (LBF)
EXTERNAL PRESSURE INTEGRAL.....	-1045. (LBF)
TOTAL EXTERNAL DRAG.....	-1092. (LBF)
TOTAL STRUT DRAG.....	18.82 (LBF)
CAVITY FORCE.....	-1310. (LBF)
CALCULATED LOAD CELL FORCE.....	-4320. (LBF)
MEASURED LOAD CELL FORCE.....	-1574. (LBF)
FUEL VACUUM SPECIFIC IMPULSE.....	

COMBUSTOR

FUEL-AIR RATIO.....	0.0023
EQUIVALENCE RATIO.....	0.214
COMBUSTOR EFFICIENCY.....	0.694
TOTAL PRESSURE RATIO.....	0.1212
COMBUSTOR EFFECTIVENESS.....	0.6441
INJECTOR DISCHARGE COEFFICIENTS.....	

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = CS.....	0.9729
NOZZLE COEFFICIENT = CT.....	0.9116
PROCESS EFFICIENCY.....	1.1691
KINETIC ENERGY EFFICIENCY.....	0.9406

STATIONS

NOMINAL COMB. LEADING EDGE.....	34.884 (IN)
SPIKE TRANSLATION.....	0.4100 (IN)
INLET THROAT.....	40.400 (IN)
COMB. LEADING EDGE.....	35.295 (IN)
NOZZLE SHROUD TRAILING EDGE.....	73.635 (IN)
NOZZLE PLUG TRAILING EDGE.....	87.387 (IN)
STRUT LEADING EDGE.....	56.351 (IN)
STRUT TRAILING EDGE.....	65.131 (IN)
COMBUSTOR EXIT.....	65.151 (IN)

FUEL INJECTIONS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.396	B
1C	44.300	
2A	48.871	
2C	46.250	
3A	54.161	
3B	56.346	
4	44.896	

Reading 34

$t = 148.55 \text{ sec.}$

A pressure measurement for specifically  
determining the outerbody cavity purge  
tare force was "off scale".

12/23/74

READING # 0034 BLOCK # 131 TIME # 140.552 MACH 6.0 PI # 740.249 TI # 3001.9  
 RAMJET PERFORMANCE

SUMMARY REPORT

74

P	T	M	S	GAMMA	MOLYT	SONY	MACH	VEL	S	W/A	A	A/C	MUPTM	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	740.249	3002	670.00	7953	1.2926	28.972	2580										
0.000	0.391	408	-31.00	981	1.3989	28.971	989	5.986	5923	1.827	0.10636	26.647	0.9780	5003	9.791	187.6	
SPRIKE TIP NS	2	0	4														
0.600	18.137	3002	670.00	7953	1.2925	28.971	2580										
0.600	16.192	2934	649.31	7753	1.2947	28.971	2553	0.398	1016	2.082	0.10636	26.647	0.9780	4947	1.879	185.7	
WIND TUNNEL	3	0	0														
0.000	740.249	3002	670.00	7953	1.2926	28.972	2580										
0.000	0.181	405	-31.00	971	1.3969	28.971	987	6.006	5925	1.827	0.10492	26.642	0.9780	4936	9.884	187.8	
SPRIKE TIP NS	4	0	0														
0.600	18.137	3002	670.00	7953	1.2925	28.971	2580										
0.600	16.192	2934	650.40	7753	1.2946	28.971	2558	0.391	999	2.082	0.10492	26.642	0.9780	4936	1.829	187.8	
INLET THRUAT	5	0	9														
40.400	2666.348	2226	442.10	5703	1.3177	28.972	2243										
40.400	3.623	370	-40.10	891	1.3984	28.971	942	5.213	4912	1.847	0.95171	26.647	0.1093	4175	72.651	196.7	
INLET UPNRSK	6	0	3														
40.400	2666.348	2226	442.10	5703	1.3177	28.972	2243										
40.400	3.330	356	-43.51	852	1.3981	28.971	928	5.336	4930	1.847	0.86519	26.647	0.1202	4185	88.881	197.1	
INLET DOWNRSK	7	0	4														
40.400	124.384	2226	442.10	5703	1.3179	28.972	2244										
40.400	111.817	2169	426.10	5553	1.3198	28.972	2217	0.404	895	1.863	0.86519	26.647	0.1202	4185	12.037	197.1	
COMBUSTOR	8	0	1														
40.403	361.742	2623	446.10	7053	1.3010	28.284	2449										
40.403	12.981	1143	28.50	2803	1.3168	28.289	1657	2.769	4588	1.887	0.99417	26.731	0.1094	4175	60.031	196.2	0.09 0.79
COMBUSTOR	9	0	2														
40.410	360.859	2623	445.80	7053	1.3010	28.290	2449										
40.410	12.999	1144	28.50	2803	1.3168	28.290	1659	2.766	4586	1.887	0.95458	26.731	0.1093	4174	60.028	196.2	0.09 0.79
COMBUSTOR	10	0	3														
41.388	240.801	2501	394.80	7033	1.3061	26.864	2459										
41.388	16.619	1285	36.40	3413	1.3567	26.864	1798	2.372	4264	1.984	0.95875	26.850	0.1093	4024	63.539	149.9	0.23 0.42
COMBUSTOR	11	0	4														
41.398	239.586	2501	399.20	7033	1.3060	26.867	2459										
41.398	16.656	1288	36.40	3423	1.3565	26.867	1799	2.368	4261	1.985	0.92801	26.850	0.1094	4023	63.436	149.8	0.23 0.42
COMBUSTOR	12	0	5														
41.463	234.551	2501	394.80	7033	1.3059	26.882	2458										
41.463	16.696	1300	35.40	3453	1.3576	26.882	1807	2.346	4240	1.986	0.95832	26.850	0.1094	4012	63.142	149.4	0.23 0.43
COMBUSTOR	13	0	6														
41.500	229.323	2509	392.30	7053	1.3054	26.898	2460										
41.500	17.230	1320	36.20	3503	1.3563	26.898	1819	2.321	4221	1.988	0.95293	26.850	0.1093	4005	62.935	149.2	0.23 0.45
COMBUSTOR	14	0	7														
42.460	154.785	2626	326.90	7403	1.2976	27.167	2497										
42.460	23.856	1677	36.50	4513	1.3335	27.167	2023	1.884	3812	2.024	0.95329	26.934	0.1103	3865	56.474	143.5	0.23 0.68
COMBUSTOR	15	0	8														
44.183	123.548	2682	210.40	7513	1.2907	27.635	2496										
44.183	26.940	1927	22.80	5203	1.3180	27.635	2138	1.598	3416	2.025	0.91680	26.934	0.1147	3739	46.071	138.8	0.23 1.00
COMBUSTOR	16	0	9														
44.310	124.775	2655	201.80	7433	1.2916	27.635	2484										
44.310	29.833	1900	20.80	5123	1.3191	27.635	2123	1.607	3412	2.021	0.91595	26.934	0.1146	3733	46.362	138.8	0.23 1.00
COMBUSTOR	17	0	10														
44.800	130.147	2550	168.40	7103	1.2952	27.636	2438										
44.800	29.421	1794	22.00	4813	1.3236	27.636	2067	1.642	3395	2.006	0.91235	26.934	0.1153	3711	46.136	137.8	0.23 1.00
COMBUSTOR	18	0	11														
44.898	131.460	2529	161.70	7033	1.2959	27.636	2428										
44.898	29.311	1773	20.80	4703	1.3246	27.636	2055	1.651	3394	2.002	0.91157	26.934	0.1154	3707	46.074	137.8	0.23 1.00



READING = 0034 BLOCK = 131 TIME = 140.552 MACH 0.0 PT = 748.249 TI = 3001.9

	P	T	M	GAMMA	MOUNT	SONV	MACH	VEL	S	W/A	W	A/C	POWTR	G	IVAC	PHI	STAC
COMBUSTOR	0	14	12	200													
46.260	126.730	2404	147.7	(689)	1.2975	27.036	2408										
46.260	27.770	1732	-80.4	(462)	1.3265	27.036	2033	1.062	3370	1.499	0.00031	20.934	0.1222	3698	45.160	137.3	0.23 1.00
COMBUSTOR	0	20	13	200													
47.310	108.969	2603	197.8	(739)	1.2920	27.035	2479										
47.310	26.593	1899	-830.9	(512)	1.3191	27.036	2123	1.593	3303	2.030	0.00010	20.934	0.1314	3727	42.070	138.0	0.23 1.00
COMBUSTOR	0	21	14	200													
47.423	107.452	2600	203.2	(744)	1.2915	27.035	2406										
47.423	26.195	1912	-827.1	(515)	1.3186	27.036	2130	1.594	3395	2.033	0.79427	20.934	0.1324	3731	41.907	138.5	0.23 1.00
COMBUSTOR	0	22	15	200													
48.110	94.929	2762	239.8	(776)	1.2880	27.035	2530										
48.110	25.053	2004	0.4	(543)	1.3149	27.036	2177	1.576	3432	2.050	0.74503	20.934	0.1411	3779	39.742	140.3	0.23 1.00
COMBUSTOR	0	23	16	10													
48.863	81.384	2404	298.8	(803)	1.3078	22.406	2696										
48.863	24.519	1953	98.7	(644)	1.3278	22.406	2404	1.316	3164	2.394	0.09040	27.444	0.1552	3872	33.944	141.1	0.80 0.28
COMBUSTOR	0	24	17	2													
48.873	81.265	2497	299.2	(804)	1.3077	22.406	2697										
48.873	29.593	1956	99.4	(645)	1.3276	22.406	2406	1.314	3162	2.400	0.09050	27.444	0.1554	3873	33.881	141.1	0.80 0.28
COMBUSTOR	0	25	18	4													
49.403	75.702	2664	322.9	(906)	1.3007	22.401	2773										
49.403	31.450	2162	134.7	(719)	1.3184	22.401	2516	1.220	3068	2.426	0.04485	27.444	0.1662	3952	30.750	144.0	0.80 0.31
COMBUSTOR	0	26	19	4													
52.913	60.686	3204	467.7	(1114)	1.2797	22.406	3011										
52.913	22.200	2554	212.7	(864)	1.3023	22.406	2711	1.317	3572	2.516	0.45193	27.534	0.2379	4409	25.085	160.1	0.81 0.38
COMBUSTOR	0	27	20	3													
53.413	59.728	3235	487.1	(1126)	1.2787	22.473	3025										
53.413	20.587	2545	215.9	(861)	1.3028	22.473	2708	1.360	3684	2.523	0.43340	27.534	0.2480	4450	29.814	162.0	0.81 0.35
COMBUSTOR	0	28	21	3													
54.163	58.009	3295	519.6	(1150)	1.2766	22.463	3051										
54.163	18.946	2563	222.8	(868)	1.3023	22.463	2718	1.399	3801	2.533	0.44059	27.534	0.2631	4530	24.136	164.5	0.81 0.35
COMBUSTOR	0	29	22	3													
54.923	56.736	3332	583.5	(1165)	1.2756	22.433	3069										
54.923	17.287	2582	235.2	(864)	1.3031	22.436	2710	1.447	3928	2.541	0.48636	27.534	0.2782	4593	23.585	166.8	0.81 0.34
COMBUSTOR	0	30	23	3													
55.760	55.041	3367	573.4	(1187)	1.2736	22.415	3093										
55.760	16.066	2571	249.7	(872)	1.3026	22.419	2725	1.477	4024	2.552	0.43488	27.534	0.2906	4656	22.816	169.1	0.81 0.33
COMBUSTOR	0	31	24	5													
56.348	43.916	3818	593.9	(1391)	1.2487	22.788	3225										
56.348	15.209	3061	276.7	(1052)	1.2797	22.806	2922	1.363	3984	2.602	0.29216	27.534	0.3679	4842	18.087	175.9	0.81 0.45
COMBUSTOR	0	32	25	5													
56.403	40.282	3547	595.8	(1249)	1.2654	22.516	3148										
56.403	12.046	2611	220.6	(885)	1.2997	22.524	2737	1.583	4333	2.577	0.29134	27.534	0.3690	4846	19.617	176.0	0.81 0.36
COMBUSTOR	0	33	26	2													
56.543	40.140	3554	600.6	(1292)	1.2651	22.511	3151										
56.543	11.944	2614	223.3	(886)	1.2997	22.520	2739	1.587	4345	2.578	0.28935	27.534	0.3715	4852	19.539	176.3	0.81 0.36
COMBUSTOR	0	34	27	4													
56.623	44.629	3608	603.4	(1348)	1.2498	22.754	3225										
56.623	14.808	3022	275.4	(1037)	1.2816	22.772	2908	1.393	4051	2.601	0.29254	27.534	0.3675	4861	18.417	176.5	0.81 0.44
COMBUSTOR	0	35	28	3													
56.903	45.136	3799	615.0	(1345)	1.2507	22.722	3224										
56.903	14.400	2987	275.1	(1024)	1.2833	22.740	2855	1.420	4112	2.601	0.29173	27.534	0.3685	4878	18.640	177.2	0.81 0.43
COMBUSTOR	0	36	29	4													
57.129	46.606	3720	620.7	(1315)	1.2560	22.626	3204										
57.129	13.324	2844	261.2	(971)	1.2899	22.640	2838	1.444	4241	2.594	0.29108	27.534	0.3693	4890	19.183	177.6	0.81 0.40
COMBUSTOR	0	37	30	13													
58.873	102.751	2742	676.9	(953)	1.3084	21.607	2873										
58.873	5.025	1279	140.1	(418)	1.3668	21.607	2006	2.564	5183	2.448	0.28463	27.534	0.3777	4922	22.927	178.7	0.81 0.08

HEADING = 0034 BLOCK = 131 TIME = 148.552 MAGM 0.0 PI = 748.249 TI = 3001.9

	P	T	M	GAMMA	MOL-I	SONV	MACH	VEL	S	A/A	A/AC	MUTM	U	IVAC	PHI	EIAC		
COMBUSTOR	U	30	31	0														
60.883	42.120	4161	735.6	(1496)	1.2277	22.819	3344											
60.883	23.625	3746	536.2	(1321)	1.2466	22.854	3190	0.940	3158	2.044	0.29454	27.534	0.3650	4511	14.056	178.4	0.81	0.47
COMBUSTOR	0	39	32	4														
62.303	43.260	4135	772.8	(1481)	1.2325	22.884	3342											
62.403	22.125	5630	545.0	(1277)	1.2503	22.717	3154	1.069	3376	2.044	0.30252	27.534	0.3553	4903	15.073	178.1	0.81	0.42
COMBUSTOR	0	40	33	4														
64.767	40.870	4079	631.6	(1482)	1.2363	22.489	3343											
64.767	20.473	3502	602.0	(1255)	1.2622	22.517	3151	1.076	3391	2.054	0.28676	27.534	0.3749	4887	15.113	171.5	0.81	0.36
COMBUSTOR	0	41	34	3														
65.143	37.907	4084	840.4	(1489)	1.2376	22.474	3344											
65.143	20.013	3600	823.7	(1270)	1.2604	22.502	3166	1.040	3293	2.062	0.26659	27.534	0.4032	4885	15.042	171.4	0.81	0.36
COMBUSTOR	MEGEN	42	35	7														
65.143	37.907	3568	609.0	(1257)	1.2640	22.505	3156											
65.143	13.562	2873	325.7	(985)	1.2905	22.514	2881	1.316	3765	2.001	0.26659	27.534	0.4032	4684	15.597	169.4	0.81	0.36
NOZZLE	AE	43	36	5														
67.379	37.907	4084	840.4	(1489)	1.2376	22.474	3344											
67.379	1.030	1822	-67.0	(595)	1.3299	22.515	2313	2.913	6738	2.062	0.05550	27.534	1.9371	6278	5.811	228.0	0.81	0.36
NOZZLE	PO	44	37	5														
67.379	37.907	4084	840.4	(1489)	1.2376	22.474	3344											
67.379	0.391	1425	-208.3	(457)	1.3494	22.515	2081	3.511	7234	2.062	0.02889	27.534	3.7210	6523	3.248	238.4	0.81	0.36
NOZZLE	AE	MEGEN	45	36	4													
67.379	37.907	3568	609.0	(1257)	1.2640	22.505	3156											
67.379	0.891	1477	-187.5	(474)	1.3485	22.515	2086	3.012	6313	2.001	0.05549	27.534	1.9372	5845	5.444	212.3	0.81	0.36
NOZZLE	PO	MEGEN	46	39	4													
67.379	37.907	3568	609.0	(1257)	1.2640	22.505	3156											
67.379	0.391	1190	-284.3	(378)	1.3624	22.515	1892	3.533	6886	2.001	0.03197	27.534	3.3628	6058	3.321	220.0	0.81	0.36
PCTIVE COMBUSTOR	65	58	0															
65.143	2888.348	5912	840.4	(2176)	1.1800	24.488	3766											
65.143	0.391	925	-1258.7	(273)	1.3573	24.084	1584	8.470	10249	2.350	0.06967	27.534	1.5430	8925	11.096	324.1	0.81	1.00
PCTIVE NOZZLE	66	59	0															
67.379	168.448	3286	490.5	(1146)	1.2774	22.513	3045											
67.379	0.400	717	-437.7	(224)	1.3857	22.515	1481	4.603	6815	2.035	0.05550	27.534	1.9371	6031	5.876	219.0	0.81	0.36

X488	P-18	P-08	PDA	GUX	U-18	G-08	CANALL	P-18/P80	P-18/P10	P-08/P80	P-08/P10
6.981E-01	2.250E 00	0.000	-0.420E-01	0.000	0.000	0.000	2.470E-02	5.760E 00	3.007E-03	0.000	0.000
3.070E 01	2.250E 00	0.000	-2.568E 02	0.000	0.000	0.000	4.564E 02	5.760E 00	3.007E-03	0.000	0.000
3.508E 01	3.972E 00	0.000	-0.584E 02	0.000	0.000	0.000	6.315E 02	1.017E 01	5.308E-03	0.000	0.000
3.528E 01	4.014E 00	0.000	-5.319E 02	0.000	0.000	0.000	6.406E 02	1.028E 01	5.366E-03	1.473E 01	7.692E-03
3.529E 01	4.015E 00	5.762E 00	-5.320E 02	0.000	0.000	0.000	6.406E 02	1.028E 01	5.366E-03	1.473E 01	7.692E-03
3.535E 01	4.070E 00	6.047E 00	-5.334E 02	0.000	0.000	0.000	6.411E 02	1.028E 01	5.366E-03	1.473E 01	7.692E-03
3.606E 01	4.085E 00	6.599E 00	-5.400E 02	0.000	0.000	0.000	7.190E 02	1.025E 01	5.352E-03	1.689E 01	8.082E-03
3.648E 01	4.189E 00	7.053E 00	-5.456E 02	0.000	0.000	0.000	7.626E 02	1.073E 01	5.599E-03	1.806E 01	9.427E-03
3.701E 01	4.180E 00	7.627E 00	-5.609E 02	0.000	0.000	0.000	8.195E 02	1.070E 01	5.586E-03	1.953E 01	1.019E-02
3.741E 01	4.460E 00	8.062E 00	-5.753E 02	0.000	0.000	0.000	8.617E 02	1.142E 01	5.961E-03	2.064E 01	1.078E-02
3.794E 01	4.829E 00	1.185E 01	-5.954E 02	0.000	0.000	0.000	9.196E 02	1.236E 01	6.454E-03	3.034E 01	1.584E-02
3.803E 01	4.890E 00	1.171E 01	-5.974E 02	0.000	0.000	0.000	9.292E 02	1.252E 01	6.535E-03	2.999E 01	1.565E-02
3.843E 01	5.057E 00	1.108E 01	-6.097E 02	0.000	0.000	0.000	9.742E 02	1.704E 01	8.896E-03	2.837E 01	1.481E-02
3.875E 01	5.209E 00	1.380E 01	-6.197E 02	0.000	0.000	0.000	1.010E 03	2.061E 01	1.076E-02	3.532E 01	1.844E-02
3.890E 01	5.717E 00	1.510E 01	-6.222E 02	0.000	0.000	0.000	1.028E 03	2.232E 01	1.165E-02	3.866E 01	2.018E-02
3.901E 01	5.190E 00	1.516E 01	-6.225E 02	0.000	0.000	0.000	1.040E 03	2.232E 01	1.165E-02	3.866E 01	2.018E-02
3.941E 01	1.612E 01	1.516E 01	-6.348E 02	0.000	0.000	0.000	1.086E 03	4.272E 01	2.154E-02	3.933E 01	2.053E-02
3.950E 01	1.762E 01	1.461E 01	-6.337E 02	0.000	0.000	0.000	1.096E 03	4.312E 01	2.235E-02	3.792E 01	1.980E-02
3.990E 01	1.819E 01	1.227E 01	-6.609E 02	0.000	0.000	0.000	1.143E 03	4.562E 01	2.831E-02	3.143E 01	1.640E-02
4.000E 01	1.832E 01	1.064E 01	-6.666E 02	0.000	0.000	0.000	1.155E 03	4.891E 01	2.849E-02	2.725E 01	1.422E-02
4.000E 01	2.004E 01	3.944E 00	-7.024E 02	0.000	0.000	0.000	1.201E 03	5.624E 01	2.945E-02	1.910E 01	5.270E-03
4.000E 01	2.006E 01	3.900E 00	-7.023E 02	0.000	0.000	0.000	1.201E 03	5.624E 01	2.945E-02	1.910E 01	5.270E-03
4.001E 01	2.213E 01	3.886E 00	-7.034E 02	0.000	0.000	0.000	1.233E 03	5.666E 01	2.958E-02	9.948E 00	5.193E-03
4.109E 01	3.121E 01	2.031E 01	-8.236E 02	0.000	0.000	0.000	1.319E 03	7.989E 01	4.171E-02	5.200E 00	2.714E-03
4.100E 01	3.130E 01	2.012E 01	-8.379E 02	0.000	0.000	0.000	1.319E 03	8.013E 01	4.183E-02	5.151E 00	2.649E-03
4.146E 01	3.190E 01	1.889E 01	-8.478E 02	0.000	0.000	0.000	1.337E 03	8.167E 01	4.264E-02	4.835E 00	2.524E-03
4.150E 01	3.225E 01	2.209E 01	-8.533E 02	0.000	0.000	0.000	1.346E 03	8.256E 01	4.310E-02	5.656E 00	2.953E-03
4.240E 01	3.727E 01	1.044E 01	-9.703E 02	0.000	0.000	0.000	1.446E 03	9.243E 01	4.982E-02	2.672E 01	1.395E-02
4.418E 01	3.468E 01	2.520E 01	-1.079E 03	0.000	0.000	0.000	1.655E 03	8.878E 01	4.635E-02	6.451E 01	3.368E-02
4.400E 01	3.375E 01	2.509E 01	-1.098E 03	0.000	0.000	0.000	1.730E 03	8.629E 01	4.943E 01	6.940E 01	3.365E-02
4.400E 01	3.355E 01	2.508E 01	-1.100E 03	0.000	0.000	0.000	1.742E 03	8.588E 01	4.883E-02	6.424E 01	3.351E-02
4.626E 01	3.070E 01	2.466E 01	-1.049E 03	0.000	0.000	0.000	1.804E 03	7.960E 01	4.103E-02	6.359E 01	3.320E-02
4.731E 01	2.851E 01	2.466E 01	-1.049E 03	0.000	0.000	0.000	1.804E 03	7.960E 01	4.103E-02	6.359E 01	3.320E-02
4.732E 01	2.775E 01	2.464E 01	-1.040E 03	0.000	0.000	0.000	1.804E 03	7.960E 01	4.103E-02	6.359E 01	3.320E-02
4.811E 01	2.314E 01	2.697E 01	-9.623E 02	0.000	0.000	0.000	2.034E 03	7.105E 01	3.709E-02	6.312E 01	3.295E-02
4.806E 01	2.952E 01	2.952E 01	-8.790E 02	0.000	0.000	0.000	2.233E 03	7.557E 01	3.945E-02	6.504E 01	3.604E-02
4.807E 01	2.955E 01	2.955E 01	-8.774E 02	0.000	0.000	0.000	2.235E 03	7.566E 01	3.950E-02	7.557E 01	3.945E-02
4.902E 01	3.135E 01	3.135E 01	-7.933E 02	0.000	0.000	0.000	2.301E 03	8.266E 01	4.140E-02	8.026E 01	4.190E-02
5.231E 01	2.820E 01	2.820E 01	-3.003E 02	0.000	0.000	0.000	2.745E 03	5.683E 01	2.967E-02	5.663E 01	2.967E-02
5.341E 01	2.059E 01	2.059E 01	-2.849E 02	0.000	0.000	0.000	2.809E 03	5.871E 01	2.751E-02	5.271E 01	2.751E-02
5.416E 01	1.952E 01	1.952E 01	-1.684E 02	0.000	0.000	0.000	2.905E 03	4.851E 01	2.532E-02	4.851E 01	2.532E-02
5.492E 01	1.729E 01	1.729E 01	-9.621E 01	0.000	0.000	0.000	3.002E 03	4.426E 01	2.310E-02	4.426E 01	2.310E-02
5.576E 01	1.007E 01	1.007E 01	-2.612E 01	0.000	0.000	0.000	3.110E 03	4.113E 01	2.310E-02	4.113E 01	2.310E-02
5.635E 01	1.521E 01	1.521E 01	-1.613E 02	0.000	0.000	0.000	3.160E 03	3.494E 01	2.033E-02	3.494E 01	2.033E-02
5.640E 01	0.962E 00	1.513E 01	-1.650E 02	0.000	0.000	0.000	3.168E 03	2.294E 01	1.198E-02	3.673E 01	2.022E-02
5.658E 01	0.962E 00	1.492E 01	-1.754E 02	0.000	0.000	0.000	3.168E 03	2.294E 01	1.198E-02	3.673E 01	2.022E-02
5.692E 01	1.461E 01	1.461E 01	-1.613E 02	0.000	0.000	0.000	3.168E 03	2.294E 01	1.198E-02	3.673E 01	2.022E-02
5.690E 01	1.440E 01	1.440E 01	-2.004E 02	0.000	0.000	0.000	3.216E 03	3.791E 01	1.979E-02	3.791E 01	1.979E-02
5.713E 01	1.332E 01	1.332E 01	-2.139E 02	0.000	0.000	0.000	3.216E 03	3.687E 01	1.924E-02	3.687E 01	1.924E-02
5.808E 01	2.025E 00	2.025E 00	-2.600E 02	0.000	0.000	0.000	3.403E 03	1.286E 01	6.716E-03	1.286E 01	6.716E-03
6.210E 01	2.212E 01	2.212E 01	-2.634E 02	0.000	0.000	0.000	3.741E 03	6.048E 01	3.157E-02	6.048E 01	3.157E-02
6.210E 01	2.212E 01	2.212E 01	-2.634E 02	0.000	0.000	0.000	3.741E 03	6.048E 01	3.157E-02	6.048E 01	3.157E-02
6.477E 01	2.067E 01	2.067E 01	-2.634E 02	0.000	0.000	0.000	3.923E 03	5.664E 01	2.957E-02	5.664E 01	2.957E-02
6.514E 01	1.957E 01	2.045E 01	-2.634E 02	0.000	0.000	0.000	4.240E 03	5.292E 01	2.763E-02	5.292E 01	2.763E-02
6.516E 01	1.957E 01	2.043E 01	-2.634E 02	0.000	0.000	0.000	4.240E 03	5.292E 01	2.763E-02	5.292E 01	2.763E-02
6.516E 01	1.957E 01	2.043E 01	-2.634E 02	0.000	0.000	0.000	4.240E 03	5.292E 01	2.763E-02	5.292E 01	2.763E-02

ORIGINAL PAGE IS  
OF POOR QUALITY

XARS	P-18	P-08	PDA	UUA	W-1E	QACD	CNALL	P-18/PSU	P-18/P10	P-08/PSU	P-08/P10
6.538E 01	1.450E 01	4.031E 01	2.634E 02	4.117E 03	-2.255E 03	6.372E 03	4.319E 03	4.737E 01	2.473E-02	5.200E 01	2.714E-02
6.704E 01	9.620E 00	7.630E 00	4.192E 02	5.014E 03	-2.330E 03	7.304E 03	4.335E 03	2.463E 01	1.266E-02	1.951E 01	1.020E-02
6.771E 01	6.977E 00	7.690E 00	5.810E 02	5.315E 03	-2.358E 03	7.073E 03	4.616E 03	1.706E 01	9.324E-03	2.020E 01	1.054E-02
6.840E 01	3.940E 00	6.156E 00	7.524E 02	5.656E 03	-2.357E 03	8.003E 03	4.711E 03	1.009E 01	5.260E-03	1.570E 01	6.227E-03
6.920E 01	3.158E 00	4.535E 00	8.655E 02	5.986E 03	-2.413E 03	8.397E 03	4.749E 03	8.094E 00	4.820E-03	1.161E 01	6.061E-03
6.981E 01	2.495E 00	4.030E 00	9.014E 02	5.700E 03	-2.432E 03	8.132E 03	4.673E 03	9.187E 00	3.334E-03	1.034E 01	5.397E-03
7.076E 01	1.917E 00	3.265E 00	1.032E 03	4.310E 03	-2.458E 03	6.828E 03	4.987E 03	4.907E 00	2.562E-03	6.354E 00	4.364E-03
7.119E 01	1.655E 00	2.950E 00	1.066E 03	3.759E 03	-2.488E 03	6.827E 03	5.039E 03	4.237E 00	2.212E-03	7.553E 00	3.943E-03
7.272E 01	1.745E 00	1.530E 00	1.162E 03	1.242E 03	-2.502E 03	3.703E 03	5.224E 03	4.466E 00	2.331E-03	4.685E 00	2.444E-03
7.362E 01	1.797E 00	6.700E-01	1.210E 03	1.072E 03	-2.519E 03	1.442E 03	5.323E 03	4.601E 00	2.402E-03	1.715E 00	8.954E-04
7.363E 01	1.797E 00	6.648E-01	1.210E 03	1.090E 03	-2.519E 03	1.429E 03	5.323E 03	4.601E 00	2.402E-03	1.702E 00	8.885E-04
7.593E 01	1.875E 00	0.000	1.250E 03	3.490E 03	-2.541E 03	-2.957E 03	5.175E 03	4.600E 00	2.504E-03	0.000	0.000
7.760E 01	1.600E 00	0.000	1.327E 03	5.536E 03	-2.500E 03	-2.957E 03	5.175E 03	4.096E 00	2.138E-03	0.000	0.000
8.170E 01	1.355E 00	0.000	1.390E 03	5.576E 03	-2.519E 03	-2.957E 03	5.175E 03	3.469E 00	1.611E-03	0.000	0.000
8.451E 01	1.020E 00	0.000	1.417E 03	5.610E 03	-2.633E 03	-2.957E 03	5.633E 03	2.611E 00	1.363E-03	0.000	0.000
8.737E 01	1.830E 00	0.000	1.451E 03	5.667E 03	-2.710E 03	-2.957E 03	5.656E 03	4.736E 00	2.472E-03	0.000	0.000
8.737E 01	1.852E 00	0.000	1.452E 03	5.667E 03	-2.710E 03	-2.957E 03	5.656E 03	4.741E 00	2.475E-03	0.000	0.000

READING = 0034 BLOCK = 131 TIME = 148.552 HCH 6.0 PI = 746.249 IT = 3001.9

X	UDRAG	CDRAG	CF	MC
4.040E 01	1.299E 02	1.499E 02	1.063E-03	1.951E-02
4.040E 01	1.550E-02	1.299E 02	1.801E-03	4.182E-02
4.041E 01	1.071E-01	1.300E 02	2.000E-03	3.982E-02
4.139E 01	1.686E 01	1.489E 02	2.433E-03	4.485E-02
4.140E 01	1.721E-01	1.471E 02	2.193E-03	4.788E-02
4.140E 01	1.074E 00	1.481E 02	2.194E-03	4.814E-02
4.150E 01	6.244E-01	1.488E 02	2.288E-03	4.863E-02
4.246E 01	1.525E 01	1.640E 02	2.241E-03	6.006E-02
4.418E 01	2.519E 01	1.892E 02	2.356E-03	6.572E-02
4.431E 01	1.880E 00	1.911E 02	2.633E-03	5.984E-02
4.480E 01	7.584E 00	1.987E 02	2.594E-03	6.017E-02
4.490E 01	1.486E 00	2.001E 02	2.581E-03	6.021E-02
4.626E 01	2.005E 01	2.202E 02	2.558E-03	5.719E-02
4.731E 01	1.482E 01	2.350E 02	2.881E-03	5.204E-02
4.782E 01	1.564E 00	2.366E 02	2.669E-03	5.233E-02
4.811E 01	9.406E 00	2.460E 02	2.710E-03	4.943E-02
4.858E 01	1.051E 01	2.586E 02	3.386E-03	4.659E-02
4.887E 01	1.307E-01	2.587E 02	2.774E-03	5.775E-02
4.940E 01	5.990E 00	2.627E 02	2.803E-03	5.780E-02
5.291E 01	3.511E 01	2.979E 02	2.884E-03	4.273E-02
5.341E 01	4.607E 00	3.024E 02	2.931E-03	3.984E-02
5.416E 01	6.861E 00	3.038E 02	2.822E-03	3.738E-02
5.492E 01	6.783E 00	3.100E 02	2.917E-03	3.503E-02
5.576E 01	7.270E 00	3.233E 02	2.907E-03	3.317E-02
5.635E 01	3.006E 00	3.263E 02	2.864E-03	3.007E-02
5.640E 01	2.894E-01	3.267E 02	2.995E-03	2.218E-02
5.684E 01	1.021E 00	3.277E 02	2.670E-03	2.608E-02
5.682E 01	3.586E-01	3.283E 02	2.679E-03	2.944E-02
5.690E 01	1.943E 00	3.302E 02	3.002E-03	2.713E-02
5.713E 01	1.630E 00	3.319E 02	2.977E-03	2.674E-02
5.887E 01	1.402E 01	3.492E 02	2.986E-03	1.412E-02
6.088E 01	1.379E 01	3.597E 02	2.738E-03	3.801E-02
6.230E 01	6.209E 00	3.679E 02	3.295E-03	3.048E-02
6.477E 01	1.577E 01	3.836E 02	3.234E-03	2.931E-02
6.518E 01	2.241E 00	3.839E 02	3.227E-03	2.835E-02
6.518E 01	2.263E-01	3.841E 02	3.291E-03	2.904E-02
6.538E 01	1.182E 00	3.872E 02	3.280E-03	2.885E-02
6.704E 01	9.945E 00	3.972E 02	3.067E-03	2.804E-02
6.771E 01	3.703E 00	4.009E 02	3.057E-03	1.829E-02
6.840E 01	3.900E 00	4.048E 02	2.988E-03	1.428E-02
6.820E 01	3.188E 00	4.080E 02	2.941E-03	1.187E-02
6.981E 01	2.395E 00	4.104E 02	2.912E-03	1.059E-02
7.076E 01	3.341E 00	4.178E 02	2.871E-03	8.968E-03
7.115E 01	1.380E 00	4.231E 02	2.851E-03	8.233E-03
7.272E 01	4.400E 00	4.195E 02	2.804E-03	6.845E-03
7.362E 01	1.980E 00	4.215E 02	2.743E-03	5.174E-03
7.363E 01	2.889E-03	4.215E 02	2.743E-03	5.167E-03
7.495E 01	1.044E 00	4.232E 02	2.800E-03	7.037E-03
7.780E 01	2.120E 00	4.247E 02	2.762E-03	6.227E-03
8.170E 01	2.045E 00	4.287E 02	2.718E-03	5.464E-03
8.451E 01	9.222E-01	4.276E 02	2.662E-03	4.341E-03
8.737E 01	4.232E-01	4.280E 02	2.740E-03	6.813E-03
8.738E 01	0.000	4.280E 02	2.740E-03	6.818E-03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... 1023. (LBF)  
MEASURED THRUST..... 1714. (LBF)  
CALCULATED SPECIFIC IMPULSE..... 1395. (LBF-SEC/LBM)  
MEASURED SPECIFIC IMPULSE..... 2337. (LBF-SEC/LBM)  
CALCULATED THRUST COEFFICIENT..... 0.4081  
MEASURED THRUST COEFFICIENT..... 0.6833

REGENERATIVE-COOLED ENGINE PERFORMANCE  
CALCULATED

STREAM THRUST..... 5615. (LBF)  
ST THRUST..... 608. (LBF)  
SPECIFIC IMPULSE..... 829. (LBF-SEC/LBM)  
THRUST COEFFICIENT..... 0.2423

INLET

ANGLE OF ATTACK ..... 0.000 (DEGREES)  
MASS FLOW RATIO..... 0.9760  
ADDITIONAL DRAG COEFFICIENT..... 0.0010  
LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1645  
DELTA PT2..... 0.0853 (PSI)  
TOTAL PRESSURE RECOVERY = SUPERSONIC..... 3.6334  
TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1662  
INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.9660  
INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9660  
KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.7467  
KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.6527  
ENTHALPY AT P0 = SUPERSONIC..... 82.11 (BTU/LBM)  
ENTHALPY AT P0 = SUBSONIC..... -15.47 (BTU/LBM)

COMBUSTOR

FUEL/AIR RATIO..... 0.0274  
EQUIVALENCE RATIO..... 0.805  
COMBUSTION EFFICIENCY..... 0.360  
TOTAL PRESSURE RATIO..... 0.0132  
COMBUSTION EFFECTIVENESS..... 0.5001  
INJECTOR DISCHARGE COEFFICIENTS

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = CS..... 0.9607  
NOZZLE COEFFICIENT = CI..... 0.8894  
PROCESS EFFICIENCY..... 1.2851  
KINETIC ENERGY EFFICIENCY..... 0.8903

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 129.9 (LBF)  
INLET MOMENTUM CHANGE..... 632.3 (LBF)  
COMBUSTOR FRICTION DRAG..... 256.0 (LBF)  
COMBUSTOR STRUT DRAG..... 0.02 (LBF)  
COMBUSTOR MOMENTUM CHANGE..... 710. (LBF)  
NOZZLE FRICTION DRAG..... 42.16 (LBF)  
NOZZLE STRUT DRAG..... 0.00 (LBF)  
NOZZLE MOMENTUM CHANGE..... 1146. (LBF)  
NOZZLE PRESSURE INTEGRAL..... 1186. (LBF)  
EXTERNAL FRICTION DRAG..... 64.80 (LBF)  
EXTERNAL PRESSURE INTEGRAL..... 1000. (LBF)  
TOTAL EXTERNAL DRAG..... 1065. (LBF)  
TOTAL STRUT DRAG..... 0.02 (LBF)  
CAVITY FORCE..... 1298. (LBF)  
CALCULATED LOAD CELL FORCE..... 1340. (LBF)  
MEASURED LOAD CELL FORCE..... 6650. (LBF)  
FUEL VACUUM SPECIFIC IMPULSE

STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
SPINE TRANSLATION..... 0.4026 (IN)  
COWL LEADING EDGE..... 35.287 (IN)  
NOZZLE SHROUD TRAILING EDGE..... 73.627 (IN)  
NOZZLE PLUG TRAILING EDGE..... 67.374 (IN)  
STRUT LEADING EDGE..... 56.543 (IN)  
STRUT TRAILING EDGE..... 65.143 (IN)  
COMBUSTOR EXIT..... 65.143 (IN)

FUEL INJECTORS

INJECTORS STATION VALVE  
1A 40.400 A  
1C 44.500 C  
2A 48.863  
2C 46.250  
3A 54.153  
3B 56.338  
4 44.888

Reading 34

$t = 181.85 \text{ sec.}$

A pressure measurement for specifically  
determining the outerbody cavity purge  
tare force was "off scale".

12/23/74

SUMMARY REPORT

ORIGINAL PAGE IS  
 OF POOR QUALITY

	P	T	H	S	GAMMA	MOLWT	SONY	MACH	VEL	S	N/A	M	A/AC	PUMP	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5															
0.000	749.499	2959	650.9	(782)	1.2940	28.972	2563											
0.000	0.389	390	633.2	(96)	1.3960	28.971	978	0.009	5876	1.823	0.10640	26.753	0.9817	4903	9.717	186.3		
SPIKE TIP N8	2	0	5															
0.600	18.175	2959	650.9	(782)	1.2939	28.971	2563											
0.600	16.482	2893	631.0	(763)	1.2960	28.971	2536	0.393	997	2.078	0.10640	26.753	0.9817	4908	1.649	185.7		
WIND TUNNEL	3	0	0															
0.000	749.499	2959	650.9	(782)	1.2940	28.972	2563											
0.000	0.389	390	633.2	(95)	1.3980	28.971	977	0.014	5877	1.823	0.10601	26.655	0.9817	4905	9.682	186.3		
SPIKE TIP N8	4	0	0															
0.600	18.175	2959	650.9	(782)	1.2939	28.971	2563											
0.600	16.476	2893	631.2	(763)	1.2960	28.972	2537	0.391	993	2.078	0.10601	26.655	0.9817	4903	1.636	186.3		
INLET THROAT	5	0	6															
0.400	127.403	3783	918.6	(1028)	1.2681	28.969	2869											
0.400	42.442	2973	661.2	(786)	1.2935	28.972	2569	1.387	3562	2.021	0.95028	26.753	0.1095	4153	52.825	153.2		
INLET UPRAISK	6	0	3															
0.400	127.403	3783	918.6	(1028)	1.2681	28.969	2869											
0.400	33.699	2820	615.2	(741)	1.2984	28.972	2507	1.545	3872	2.021	0.86753	26.753	0.1204	4239	52.201	159.2		
INLET DOWNRISK	7	0	4															
0.400	115.696	3782	914.7	(1028)	1.2680	28.969	2869											
0.400	87.104	3560	843.3	(961)	1.2750	28.970	2791	0.670	1891	2.020	0.86753	26.753	0.1204	4259	25.490	159.2		
COMBUSTOR	8	1	21															
0.410	89.071	3726	919.5	(1049)	1.2693	27.876	2904											
0.410	13.911	2439	510.2	(653)	1.3119	27.981	2389	1.892	4520	2.110	0.95708	26.930	0.1095	4151	47.227	134.7	4.09	0.07
COMBUSTOR	9	2	21															
0.410	72.983	3839	909.7	(1134)	1.2664	26.880	3016											
0.410	18.177	2823	651.4	(805)	1.3008	26.987	2620	1.584	4150	2.217	0.96088	26.930	0.1095	3984	61.971	147.9	0.21	0.05
COMBUSTOR	10	3	21															
0.410	73.994	3803	906.6	(1123)	1.2696	26.935	3004											
0.410	18.224	2783	653.1	(793)	1.3029	26.940	2606	1.591	4146	2.215	0.96010	26.930	0.1095	3982	61.856	147.8	0.21	0.01
COMBUSTOR	11	4	21															
0.410	73.428	3814	1008.4	(1127)	1.2697	26.928	3013											
0.410	18.529	2807	664.9	(801)	1.3022	26.933	2617	1.875	4121	2.215	0.96148	26.930	0.1094	3970	61.589	147.4	0.21	0.09
COMBUSTOR	12	5	21															
0.410	73.389	3824	1006.3	(1130)	1.2696	26.927	3017											
0.410	18.966	2831	670.9	(809)	1.3015	26.932	2628	1.559	4097	2.215	0.96141	26.930	0.1094	3961	61.208	147.1	0.21	0.00
COMBUSTOR	13	6	21															
0.420	66.748	4045	1088.6	(1207)	1.2606	26.824	3097											
0.420	24.514	3261	814.4	(990)	1.2874	26.934	2810	1.319	3706	2.229	0.95488	27.024	0.1105	3896	54.989	140.8	0.22	0.00
COMBUSTOR	14	7	21															
0.420	61.442	4449	1243.7	(1343)	1.2432	26.934	3226											
0.420	30.819	3872	1027.9	(1150)	1.2657	26.923	3037	1.082	3286	2.292	0.91936	27.024	0.1148	3666	46.456	135.7	0.22	0.00
COMBUSTOR	15	8	21															
0.420	57.796	4848	1255.9	(1468)	1.2023	26.945	3286											
0.420	30.699	4358	1040.8	(1302)	1.2233	26.956	3136	1.046	3281	2.221	0.91805	27.024	0.1149	3659	46.802	135.4	0.22	0.44
COMBUSTOR	16	9	21															
0.420	57.882	4636	1300.6	(1404)	1.2274	26.936	3271											
0.420	30.270	4100	1088.1	(1225)	1.2503	26.992	3102	1.051	3261	2.214	0.91473	27.024	0.1153	3633	46.156	134.4	0.22	0.07
COMBUSTOR	17	10	21															
0.420	57.740	4613	1309.0	(1398)	1.2332	26.979	3274											
0.420	30.132	4067	1096.6	(1215)	1.2556	26.924	3100	1.052	3259	2.212	0.91357	27.024	0.1155	3629	46.274	134.2	0.22	0.01
COMBUSTOR	18	11	21															
0.420	53.376	4642	1323.5	(1408)	1.2322	26.965	3284											
0.420	28.067	4100	1116.0	(1226)	1.2549	26.913	3112	1.045	3253	2.212	0.86236	27.024	0.1223	3612	43.596	133.0	0.22	0.00



READING = 0034 BLOCK = 168 TIME = 101.052 MACH 0.0 P1 = 740.499 T1 = 2950.7

	P	T	M	GAMMA	MOLYB	SDNY	MACH	VEL	W/A	W	A/C	WQPTH	Q	IVAC	PMJ	ETAC
COMBUSTOR	0	19	12	21												
47.310	52.260	4461	1244.6	(1347)	1.2415	26.590	3230									
47.310	26.482	3694	1036.1	(1157)	1.2644	26.421	3044	1.074	3269	2.306	0.80208	27.024	0.1315	3638	40.745	134.6 0.22 0.04
COMBUSTOR	0	20	13	21												
47.417	50.756	4605	1242.1	(11391)	1.2220	26.590	3244									
47.417	26.119	4070	1027.1	(11212)	1.2461	26.656	3076	1.066	3280	2.517	0.79417	27.024	0.1324	3644	40.480	134.6 0.22 0.21
COMBUSTOR	0	21	14	21												
48.110	51.738	4341	1193.2	(11306)	1.2440	26.431	3187									
48.110	25.202	3753	974.7	(11110)	1.2678	26.460	2990	1.106	3307	2.296	0.74666	27.024	0.1413	3689	38.379	134.5 0.22 0.03
COMBUSTOR	0	22	15	21												
48.857	52.538	3855	1194.7	(11375)	1.2689	21.881	3336	0.951	3009	2.621	0.69228	27.519	0.1552	3702	34.374	137.4 0.74 0.05
48.857	30.394	3425	973.7	(11205)	1.2650	21.858	3164	0.943	2901	2.591	0.64660	27.519	0.1662	3783	32.304	137.5 0.74 0.01
COMBUSTOR	0	23	16	21												
49.397	55.816	3601	1117.3	(11278)	1.2839	21.702	3255	0.966	3007	2.607	0.69157	27.519	0.1554	3863	29.151	140.4 0.74 0.00
49.397	32.475	3188	949.1	(11116)	1.2971	21.703	3078	0.943	2901	2.591	0.64660	27.519	0.1662	4331	24.350	156.9 0.77 0.01
COMBUSTOR	0	24	17	21												
52.907	58.848	3014	873.0	(1051)	1.3024	21.654	3002	1.282	3456	2.520	0.45314	27.608	0.2379	4363	24.055	158.6 0.77 0.05
52.907	22.187	2394	634.1	(015)	1.3328	21.654	2696	1.282	3456	2.520	0.45314	27.608	0.2379	4365	20.726	159.6 1.16 0.04
COMBUSTOR	0	25	19	4												
53.407	57.792	3068	838.7	(1069)	1.2984	21.776	3016	1.321	3561	2.525	0.43462	27.608	0.2480	4366	20.690	159.6 1.16 0.04
53.407	20.887	2412	585.2	(020)	1.3324	21.777	2697	1.321	3561	2.525	0.43462	27.608	0.2480	4478	18.182	160.1 1.16 0.10
COMBUSTOR	0	26	20	9												
54.147	52.341	2780	810.5	(1072)	1.3117	19.368	3060	1.148	3211	2.734	0.41531	27.965	0.2629	4559	16.027	164.1 1.16 0.17
54.147	23.662	2293	604.5	(068)	1.3383	19.368	2796	1.148	3211	2.734	0.41531	27.965	0.2629	5128	12.087	181.4 1.16 0.35
COMBUSTOR	0	27	21	2												
54.197	52.301	2783	809.9	(1073)	1.3116	19.371	3061	1.147	3208	2.735	0.41499	27.965	0.2631	5136	12.394	181.7 1.16 0.36
54.197	23.700	2297	604.2	(069)	1.3381	19.371	2798	1.147	3208	2.735	0.41499	27.965	0.2631	5155	12.209	184.3 1.16 0.37
COMBUSTOR	0	28	22	4												
54.917	50.019	2964	758.4	(1145)	1.3015	19.600	3128	1.019	2975	2.755	0.39244	27.965	0.2782	5166	11.956	184.7 1.16 0.37
54.917	26.550	2553	581.5	(070)	1.3155	19.601	2919	0.925	2784	2.764	0.37045	27.965	0.2947	5201	11.682	186.0 1.16 0.38
COMBUSTOR	0	29	23	4												
55.760	48.565	3127	701.3	(11208)	1.2920	19.631	3182	0.925	2784	2.764	0.37045	27.965	0.2947	5227	11.491	186.9 1.16 0.39
55.760	26.738	2772	586.4	(1057)	1.3043	19.632	3010	0.925	2784	2.764	0.37045	27.965	0.2947	5363	9.363	191.6 1.16 0.41
COMBUSTOR	0	30	24	5												
56.342	44.409	3534	662.2	(11500)	1.2916	20.504	3411	0.795	2620	2.829	0.29679	27.965	0.3679			
56.342	30.427	3345	524.9	(11373)	1.2640	20.514	3296	0.795	2620	2.829	0.29679	27.965	0.3679			
COMBUSTOR	0	31	25	3												
56.397	44.201	3686	656.5	(11522)	1.2481	20.559	3425	0.815	2695	2.832	0.29591	27.965	0.3690			
56.397	29.558	3384	513.3	(11388)	1.2613	20.570	3305	0.815	2695	2.832	0.29591	27.965	0.3690			
COMBUSTOR	0	32	26	3												
56.537	44.117	3907	649.1	(11530)	1.2484	20.596	3429	0.807	2674	2.833	0.29378	27.965	0.3717			
56.537	29.739	3610	506.1	(11399)	1.2595	20.608	3312	0.807	2674	2.833	0.29378	27.965	0.3717			
COMBUSTOR	0	33	27	10												
56.617	44.904	3677	643.7	(11517)	1.2484	20.579	3419	0.783	2590	2.828	0.29707	27.965	0.3675			
56.617	30.961	3597	504.6	(11393)	1.2606	20.589	3309	0.783	2590	2.828	0.29707	27.965	0.3675			
COMBUSTOR	0	34	28	3												
56.897	45.234	3900	624.9	(11526)	1.2484	20.636	3422	0.766	2541	2.827	0.29614	27.965	0.3687			
56.897	31.687	3612	495.9	(11407)	1.2582	20.647	3317	0.766	2541	2.827	0.29614	27.965	0.3687			
COMBUSTOR	0	35	29	3												
57.123	45.511	3915	609.6	(11531)	1.2450	20.679	3423	0.753	2501	2.825	0.29558	27.965	0.3694			
57.123	32.264	3656	484.7	(11417)	1.2565	20.691	3322	0.753	2501	2.825	0.29558	27.965	0.3694			
COMBUSTOR	0	36	30	4												
58.867	47.071	3739	453.5	(11452)	1.2532	20.748	3351	0.636	2084	2.795	0.28904	27.965	0.3777			
58.867	36.712	3555	406.6	(11371)	1.2668	20.754	3277	0.636	2084	2.795	0.28904	27.965	0.3777			

READING = 0034 BLOCK = 168 TIME = 181.852 MACH = 6.0 PT = 740.499 TT = 2958.7

	P	T	M	GAMMA	MDL*1	SDNY	MACH	VEL	S	W/A	M	A/P/C	MUFIM	C	IVAC	PHI	ETAC
COMBUSTOR	0	30	31	5													
60.877	47.306	4104	361.0	(11598)	1.2259	21.359	3422										
60.877	34.375	1866	243.0	(11493)	1.2310	21.379	3536	0.729	2433	2.797	0.29915	27.905	0.3050	5328	11.312	190.5	1.16 0.56
COMBUSTOR	0	39	32	5													
62.297	47.626	4285	269.0	(1670)	1.2098	21.733	3444										
62.297	32.512	4010	124.0	(1546)	1.2236	21.769	3340	0.804	2690	2.791	0.30126	27.905	0.3553	5247	16.645	184.4	1.16 0.65
COMBUSTOR	0	40	33	5													
64.761	44.033	4414	115.0	(11717)	1.1912	22.200	3432										
64.761	22.878	1968	130.0	(11516)	1.2158	22.289	3281	1.008	3502	2.777	0.29125	27.905	0.3749	5241	15.053	187.4	1.16 0.77
COMBUSTOR	0	41	34	4													
65.137	40.807	4417	92.0	(11717)	1.1884	22.253	3425										
65.137	22.123	4006	137.0	(11531)	1.2114	22.345	3286	1.032	3391	2.780	0.27076	27.905	0.4032	5232	14.269	187.1	1.16 0.78
COMBUSTOR	42	35	21														
65.137	40.807	5015	570.7	(11997)	1.1529	21.824	3629										
65.137	31.890	4925	499.0	(11955)	1.1547	21.884	3594	0.524	1882	2.881	0.27076	27.905	0.4032	5240	7.921	187.4	1.16 0.78
NOZZLE	AE	43	36	5													
67.373	40.807	4417	92.0	(11516)	1.1884	22.253	3425										
67.373	1.209	2222	920.1	(776)	1.2890	22.411	2521	2.835	7146	2.780	0.05637	27.905	1.9371	6811	6.480	243.5	1.16 0.78
NOZZLE	PU	44	37	5													
67.373	40.807	4417	92.0	(11516)	1.1884	22.253	3425										
67.373	0.385	1706	1126.5	(578)	1.3126	22.411	2229	3.504	7810	2.780	0.02555	27.905	4.2727	7209	3.101	257.6	1.16 0.78
NOZZLE	AE	45	38	5													
67.373	40.807	5015	570.7	(11997)	1.1529	21.824	3629										
67.373	1.501	2977	919.9	(1085)	1.2602	22.407	2085	2.672	7709	2.881	0.03636	27.905	1.9371	7446	6.753	266.2	1.16 0.78
NOZZLE	PO	46	39	5													
67.373	40.807	5015	570.7	(11997)	1.1529	21.824	3629										
67.373	0.385	2220	929.0	(776)	1.2691	22.411	2320	3.430	8861	2.881	0.02178	27.905	5.0131	8024	2.932	283.9	1.16 0.78
FICTIVE COMBUSTOR	65	56	0														
65.137	127.403	4807	92.0	(1880)	1.1864	22.639	3539										
65.137	0.385	1444	1101.6	(478)	1.3234	22.795	2042	4.207	8589	2.882	0.03376	27.905	3.2340	7784	4.506	275.3	1.16 1.00
FICTIVE NOZZLE	66	59	0														
67.373	18.025	4810	462.3	(11907)	1.1505	21.857	3551										
67.373	3.179	3363	347.0	(11330)	1.3232	22.372	1112	2.040	5366	2.930	0.05036	27.905	1.9371	6815	5.576	230.8	1.16 0.78

READING = 0034 BLOCK = 166 TIME = 161.852 MACH 0.0 PT = 749.499 II = 2958.7

XAB8	P-10	P-06	P-04	60X	W-13	G-08	CANALL	P-10/P-04	P-08/P-04	P-08/P-04	P-08/P-04
6.981E-01	2.265E-00	0.000	-4.427E-01	0.000	0.000	0.000	2.470E-02	3.022E-03	0.000	0.000	0.000
3.070E-01	2.265E-00	0.000	-2.585E-02	0.000	0.000	0.000	4.504E-02	3.022E-03	0.000	0.000	0.000
3.506E-01	3.971E-00	0.000	-4.606E-02	0.000	0.000	0.000	6.315E-02	5.299E-03	0.000	0.000	0.000
3.527E-01	4.014E-00	0.000	-5.328E-02	0.000	0.000	0.000	6.401E-02	5.356E-03	1.474E-01	7.567E-03	0.000
3.528E-01	4.014E-00	0.000	-5.328E-02	0.000	0.000	0.000	6.404E-02	5.358E-03	1.476E-01	7.575E-03	0.000
3.555E-01	4.078E-00	0.000	-5.337E-02	0.000	0.000	0.000	6.674E-02	5.817E-03	1.550E-01	7.958E-03	0.000
3.606E-01	4.015E-00	0.000	-5.419E-02	0.000	0.000	0.000	7.193E-02	5.357E-03	1.691E-01	8.641E-03	0.000
3.648E-01	4.192E-00	0.000	-5.477E-02	0.000	0.000	0.000	7.629E-02	5.593E-03	1.807E-01	9.276E-03	0.000
3.701E-01	4.175E-00	0.000	-5.635E-02	1.099E-02	0.000	0.000	8.167E-02	5.593E-03	1.953E-01	1.003E-02	0.000
3.741E-01	4.403E-00	0.000	-5.780E-02	1.824E-02	2.442E-03	3.394E-03	8.614E-02	5.876E-03	2.063E-01	1.059E-02	0.000
3.794E-01	4.711E-00	0.000	-5.976E-02	2.737E-02	3.633E-03	3.633E-03	9.193E-02	6.286E-03	2.24E-01	1.575E-02	0.000
3.803E-01	4.765E-00	0.000	-5.995E-02	2.920E-02	3.561E-03	3.561E-03	9.296E-02	6.358E-03	2.202E-01	1.551E-02	0.000
3.866E-01	4.015E-00	0.000	-6.109E-02	3.610E-03	4.267E-03	4.267E-03	9.739E-02	6.558E-03	2.624E-01	1.450E-02	0.000
3.875E-01	7.759E-00	0.000	-6.109E-02	4.168E-03	4.634E-03	4.634E-03	1.011E-01	6.558E-03	3.544E-01	1.825E-02	0.000
3.890E-01	4.362E-00	0.000	-6.221E-02	4.420E-03	5.097E-03	5.097E-03	1.027E-01	6.117E-02	3.885E-01	1.995E-02	0.000
3.901E-01	8.840E-00	0.000	-6.221E-02	4.614E-03	5.296E-03	5.296E-03	1.040E-01	6.297E-02	3.905E-01	2.005E-02	0.000
3.941E-01	1.583E-01	0.000	-6.333E-02	5.290E-03	5.990E-03	5.990E-03	1.086E-01	6.117E-02	3.974E-01	2.041E-02	0.000
3.950E-01	1.747E-01	0.000	-6.333E-02	5.447E-03	6.152E-03	6.152E-03	1.097E-01	6.232E-02	3.822E-01	1.963E-02	0.000
3.990E-01	1.833E-01	0.000	-6.394E-02	6.102E-03	6.826E-03	6.826E-03	1.153E-01	6.245E-02	3.170E-01	1.628E-02	0.000
4.000E-01	1.859E-01	0.000	-6.558E-02	6.268E-03	6.998E-03	6.998E-03	1.155E-01	6.245E-02	2.732E-01	1.403E-02	0.000
4.040E-01	2.305E-01	0.000	-7.031E-02	6.843E-03	7.643E-03	7.643E-03	1.201E-01	6.375E-02	1.052E-01	3.404E-03	0.000
4.040E-01	2.305E-01	0.000	-7.031E-02	6.843E-03	7.643E-03	7.643E-03	1.201E-01	6.375E-02	1.052E-01	3.404E-03	0.000
4.041E-01	2.302E-01	0.000	-7.034E-02	6.894E-03	7.645E-03	7.645E-03	1.203E-01	6.306E-02	1.046E-01	3.395E-03	0.000
4.138E-01	3.428E-01	0.000	-8.476E-02	8.843E-03	9.854E-03	9.854E-03	1.318E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.139E-01	3.430E-01	0.000	-8.476E-02	8.870E-03	9.854E-03	9.854E-03	1.318E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.146E-01	3.509E-01	0.000	-8.602E-02	9.027E-03	9.841E-03	9.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.150E-01	3.559E-01	0.000	-8.676E-02	9.135E-03	9.949E-03	9.949E-03	1.332E-01	6.748E-02	2.601E-01	3.490E-02	0.000
4.240E-01	3.625E-01	0.000	-1.001E-01	1.140E-02	1.234E-04	1.234E-04	1.447E-01	6.503E-02	2.801E-01	1.438E-02	0.000
4.240E-01	3.625E-01	0.000	-1.001E-01	1.140E-02	1.234E-04	1.234E-04	1.447E-01	6.503E-02	2.801E-01	1.438E-02	0.000
4.418E-01	3.377E-01	0.000	-1.104E-01	1.565E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.431E-01	3.559E-01	0.000	-1.108E-01	1.572E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.480E-01	3.483E-01	0.000	-1.124E-01	1.716E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.480E-01	3.483E-01	0.000	-1.124E-01	1.716E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.626E-01	3.092E-01	0.000	-1.116E-01	1.780E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.731E-01	2.80E-01	0.000	-1.069E-01	1.561E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.742E-01	2.738E-01	0.000	-1.062E-01	1.569E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.811E-01	2.281E-01	0.000	-1.004E-01	1.429E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.860E-01	2.040E-01	0.000	-1.004E-01	1.429E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.887E-01	3.044E-01	0.000	-1.004E-01	1.429E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
4.940E-01	3.245E-01	0.000	-1.033E-01	1.633E-02	1.841E-03	1.841E-03	1.319E-01	6.599E-02	2.487E-01	2.811E-03	0.000
5.291E-01	2.239E-01	0.000	-1.055E-02	3.160E-03	1.677E-03	1.677E-03	2.745E-03	6.286E-02	5.428E-01	2.787E-02	0.000
5.341E-01	2.089E-01	0.000	-2.492E-02	4.212E-03	1.718E-03	1.718E-03	2.808E-03	6.199E-01	3.157E-02	3.157E-02	0.000
5.415E-01	2.370E-01	0.000	-1.643E-02	2.790E-03	1.779E-03	1.779E-03	2.903E-03	6.199E-01	3.157E-02	3.157E-02	0.000
5.492E-01	2.653E-01	0.000	-1.630E-02	2.790E-03	1.779E-03	1.779E-03	2.903E-03	6.199E-01	3.157E-02	3.157E-02	0.000
5.527E-01	2.674E-01	0.000	-1.542E-02	2.790E-03	1.779E-03	1.779E-03	2.903E-03	6.199E-01	3.157E-02	3.157E-02	0.000
5.636E-01	3.039E-01	0.000	-5.920E-02	1.340E-03	1.933E-03	1.933E-03	3.002E-03	6.899E-01	3.542E-02	6.899E-01	3.542E-02
5.640E-01	2.672E-01	0.000	-6.006E-02	1.444E-03	1.933E-03	1.933E-03	3.002E-03	6.899E-01	3.542E-02	6.899E-01	3.542E-02
5.654E-01	2.874E-01	0.000	-6.006E-02	1.444E-03	1.933E-03	1.933E-03	3.002E-03	6.899E-01	3.542E-02	6.899E-01	3.542E-02
5.662E-01	3.096E-01	0.000	-6.330E-02	1.630E-03	2.261E-02	2.261E-02	3.185E-03	7.405E-01	4.103E-02	7.405E-01	4.103E-02
5.690E-01	3.169E-01	0.000	-6.739E-02	2.361E-03	1.933E-03	1.933E-03	3.231E-03	8.046E-01	4.131E-02	8.046E-01	4.131E-02
5.712E-01	3.226E-01	0.000	-7.050E-02	2.705E-03	1.933E-03	1.933E-03	3.231E-03	8.046E-01	4.131E-02	8.046E-01	4.131E-02
5.887E-01	3.671E-01	0.000	-8.784E-02	6.035E-03	-2.014E-03	-7.903E-02	3.260E-03	8.394E-01	4.305E-02	8.394E-01	4.305E-02
6.008E-01	3.436E-01	0.000	-8.666E-02	9.751E-03	-2.277E-03	-7.474E-03	3.741E-03	8.933E-01	4.586E-02	8.933E-01	4.586E-02
6.230E-01	3.251E-01	0.000	-8.666E-02	-1.246E-04	-2.373E-03	-9.951E-04	3.923E-03	9.495E-01	4.336E-02	9.495E-01	4.336E-02
6.476E-01	2.289E-01	0.000	-8.666E-02	-1.686E-04	-2.535E-03	-1.410E-04	4.240E-03	5.945E-01	3.052E-02	5.945E-01	3.052E-02
6.514E-01	2.289E-01	0.000	-8.666E-02	-1.727E-04	-2.559E-03	-1.472E-04	4.288E-03	5.945E-01	3.047E-02	5.945E-01	3.047E-02

ORIGINAL PAGE IS  
OF POOR QUALITY

XAB8	P-1H	P-0E	PDA	GUR	W-IR	G-OR	CANALL	P-0IR/PSU	P-1B/P10	M-0B/PSU	M-0H/P10
6.518E 01	2.284E 01	2.125E 01	8.868E 02	-1.738E 04	-2.582E 03	-1.478E 04	4.273E 03	5.935E 01	3.047E-02	5.523E 01	2.835E-02
6.538E 01	2.150E 01	2.047E 01	8.868E 02	-1.768E 04	-2.574E 04	-1.510E 04	4.319E 03	5.942E 01	2.809E-02	5.531E 01	2.835E-02
6.704E 01	1.042E 01	9.050E 00	1.056E 03	-2.014E 04	-2.672E 03	-1.747E 04	4.535E 03	2.708E 01	1.349E-02	2.132E 01	1.207E-02
6.771E 01	7.679E 00	9.262E 00	1.241E 03	-2.049E 04	-2.788E 03	-1.868E 04	4.616E 03	2.946E 01	1.051E-02	2.407E 01	1.236E-02
6.848E 01	4.960E 00	7.514E 00	1.443E 03	-2.149E 04	-2.746E 03	-1.921E 04	4.711E 03	1.289E 01	6.618E-03	1.953E 01	1.003E-02
6.920E 01	4.270E 00	5.880E 00	1.588E 03	-2.209E 04	-2.778E 03	-2.011E 04	4.799E 03	1.110E 01	5.647E-03	1.524E 01	7.645E-03
6.981E 01	3.685E 00	5.082E 00	1.689E 03	-2.270E 04	-2.802E 03	-1.949E 04	4.873E 03	9.576E 00	4.917E-03	1.321E 01	6.781E-03
7.076E 01	2.697E 00	3.840E 00	1.809E 03	-2.084E 04	-2.835E 03	-1.800E 04	4.987E 03	7.004E 00	3.549E-03	9.974E 00	5.123E-03
7.119E 01	2.250E 00	3.520E 00	1.852E 03	-1.948E 04	-2.888E 03	-1.715E 04	5.039E 03	5.847E 00	3.002E-03	9.140E 00	4.694E-03
7.272E 01	2.288E 00	2.380E 00	1.975E 03	-1.638E 04	-2.890E 03	-1.347E 04	5.224E 03	5.944E 00	3.026E-03	6.185E 00	3.175E-03
7.362E 01	2.279E 00	7.350E-01	2.046E 03	-1.310E 04	-2.911E 03	-1.019E 04	5.323E 03	5.922E 00	3.041E-03	1.910E 00	9.807E-04
7.462E 01	2.279E 00	7.277E-01	2.047E 03	-1.305E 04	-2.911E 03	-1.017E 04	5.324E 03	5.923E 03	3.041E-03	1.891E 00	9.749E-04
7.495E 01	2.295E 00	0.000	2.096E 03	-6.740E 03	-2.936E 03	-3.802E 03	5.375E 03	5.964E 00	3.062E-03	0.000	0.000
7.780E 01	1.695E 00	0.000	2.175E 03	-6.788E 03	-2.988E 03	-3.802E 03	5.474E 03	4.405E 00	2.202E-03	0.000	0.000
8.170E 01	1.535E 00	0.000	2.244E 03	-6.833E 03	-3.030E 03	-3.802E 03	5.579E 03	3.984E 00	2.048E-03	0.000	0.000
8.451E 01	1.295E 00	0.000	2.276E 03	-6.869E 03	-3.067E 03	-3.802E 03	5.633E 03	3.865E 00	1.728E-03	0.000	0.000
8.737E 01	2.115E 00	0.000	2.317E 03	-6.925E 03	-3.126E 03	-3.802E 03	5.656E 03	5.496E 00	2.822E-03	0.000	0.000
8.137E 01	2.117E 00	0.000	2.317E 03	-6.925E 03	-3.126E 03	-3.802E 03	5.656E 03	5.501E 00	2.824E-03	0.000	0.000

ORIGINAL PAGE IS  
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X	DORAG	CDRAG	CF	MC
4.000E 01	1.290E 02	1.290E 02	2.968E-03	6.585E-02
4.041E 01	2.162E-01	1.292E 02	3.132E-03	3.164E-02
4.138E 01	2.407E 01	1.533E 02	3.351E-03	3.609E-02
4.139E 01	2.366E-01	1.235E 02	3.223E-03	3.633E-02
4.146E 01	1.538E 00	1.531E 02	3.215E-03	3.800E-02
4.150E 01	1.025E 00	1.561E 02	3.220E-03	3.930E-02
4.246E 01	2.205E 01	1.782E 02	3.391E-03	4.257E-02
4.418E 01	3.690E 01	2.151E 02	3.579E-03	4.366E-02
4.431E 01	2.720E 00	2.178E 02	3.594E-03	4.287E-02
4.480E 01	1.027E 01	2.281E 02	3.783E-03	3.947E-02
4.489E 01	1.938E 00	2.300E 02	3.680E-03	4.045E-02
4.626E 01	2.784E 01	2.578E 02	3.689E-03	3.818E-02
4.731E 01	2.004E 01	2.779E 02	3.611E-03	3.715E-02
4.742E 01	1.955E 00	2.798E 02	3.602E-03	3.609E-02
4.811E 01	1.268E 01	2.921E 02	3.604E-03	3.548E-02
4.886E 01	1.218E 01	3.033E 02	3.767E-03	3.949E-02
4.897E 01	1.447E-01	3.044E 02	3.877E-03	4.387E-02
4.900E 01	6.958E 00	3.114E 02	3.362E-03	4.533E-02
5.291E 01	3.716E 01	3.486E 02	2.898E-03	4.155E-02
5.341E 01	4.402E 00	3.530E 02	2.819E-03	4.019E-02
5.415E 01	6.396E 00	3.594E 02	3.224E-03	3.761E-02
5.416E 01	8.106E-02	3.594E 02	2.898E-03	3.285E-02
5.492E 01	5.438E 00	3.649E 02	2.855E-03	4.802E-02
5.576E 01	5.369E 00	3.702E 02	2.944E-03	4.316E-02
5.624E 01	2.097E 00	3.723E 02	2.961E-03	3.973E-02
5.640E 01	2.666E-01	3.726E 02	3.221E-03	3.502E-02
5.652E 01	7.086E-01	3.733E 02	3.235E-03	3.534E-02
5.662E 01	4.218E-01	3.737E 02	3.586E-03	3.046E-02
5.690E 01	1.478E 00	3.752E 02	3.229E-03	3.572E-02
5.712E 01	1.081E 00	3.763E 02	3.237E-03	3.561E-02
5.807E 01	7.526E 00	3.838E 02	3.226E-03	3.464E-02
6.086E 01	6.354E 00	3.922E 02	3.071E-03	3.674E-02
6.230E 01	6.839E 00	3.990E 02	3.163E-03	3.817E-02
6.474E 01	1.420E 01	4.132E 02	3.097E-03	3.573E-02
6.514E 01	2.317E 00	4.155E 02	3.280E-03	3.247E-02
6.510E 01	2.436E-01	4.158E 02	3.361E-03	3.277E-02
6.526E 01	1.251E 00	4.170E 02	3.346E-03	3.244E-02
6.704E 01	1.084E 01	4.279E 02	3.188E-03	2.246E-02
6.771E 01	4.085E 00	4.280E 02	3.165E-03	2.126E-02
6.888E 01	4.032E 00	4.264E 02	3.115E-03	1.737E-02
6.908E 01	3.890E 00	4.401E 02	3.083E-03	1.511E-02
6.981E 01	2.871E 00	4.424E 02	3.060E-03	1.365E-02
7.074E 01	3.988E 00	4.449E 02	3.017E-03	1.108E-02
7.119E 01	1.625E 00	4.685E 02	2.999E-03	1.012E-02
7.272E 01	5.238E 00	4.358E 02	2.964E-03	8.614E-03
7.362E 01	2.359E 00	4.561E 02	2.905E-03	6.217E-03
7.382E 01	3.342E-03	4.561E 02	2.904E-03	6.205E-03
7.495E 01	1.216E 00	4.574E 02	2.950E-03	6.497E-03
7.780E 01	2.374E 00	4.597E 02	2.897E-03	6.749E-03
8.179E 01	2.224E 00	4.620E 02	2.865E-03	6.207E-03
8.451E 01	1.064E 00	4.630E 02	2.831E-03	5.425E-03
8.737E 01	4.684E-01	4.635E 02	2.679E-03	7.622E-03
8.737E 01	0.000	4.635E 02	2.680E-03	7.627E-03

HAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST.....	1629. (LBF)	ANGLE OF ATTACK .....	0.000 (DEGREES)
MEASURED THRUST.....	2132. (LBF)	MASS FLOW RATIO.....	0.9817
CALCULATED SPECIFIC IMPULSE.....	1530. (LBF-SEC/LBM)	ADDITIONAL UHAG COEFFICIENT.....	0.0001
MEASURED SPECIFIC IMPULSE.....	2013. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1505
CALCULATED THRUST COEFFICIENT.....	0.6507	DELTA PT2.....	0.1946 (P81)
MEASURED THRUST COEFFICIENT.....	0.8566	TOTAL PRESSURE RECOVERY = SUPERSONIC.....	0.1110
		TOTAL PRESSURE RECOVERY = SUBSONIC.....	0.1544
STREAM THRUST.....	7231. (LBF)	INLET PROCESS EFFICIENCY = SUPERSONIC.....	0.8233
NET THRUST.....	2284. (LBF)	INLET PROCESS EFFICIENCY = SUBSONIC.....	0.6532
SPECIFIC IMPULSE.....	2120. (LBF-SEC/LBM)	KINETIC ENERGY EFFICIENCY = SUPERSONIC.....	1.1960
THRUST COEFFICIENT.....	0.9023	KINETIC ENERGY EFFICIENCY = SUBSONIC.....	1.1872
		ENTHALPY AT P0 = SUPERSONIC.....	49.35 (BTU/LBM)
		ENTHALPY AT P0 = SUBSONIC.....	95.39 (BTU/LBM)

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

MOMENTUM AND FORCES

COMBUSTOR

INLET FRICTION DRAG.....	129.0 (LBF)	FUELAIR RATIO.....	0.0394
INLET MOMENTUM CHANGE.....	832.4 (LBF)	EQUIVALENCE RATIO.....	1.158
COMBUSTOR FRICTION DRAG.....	206.5 (LBF)	COMBUSTOR EFFICIENCY.....	0.783
COMBUSTOR STRUT DRAG.....	146.82 (LBF)	TOTAL PRESSURE RATIO.....	0.1203
COMBUSTOR MOMENTUM CHANGE.....	1080. (LBF)	COMBUSTOR EFFECTIVENESS.....	0.8407
NOZZLE FRICTION DRAG.....	47.97 (LBF)	INJECTOR DISCHARGE COEFFICIENTS.....	0.9724
NOZZLE STRUT DRAG.....	0.00 (LBF)		
NOZZLE MOMENTUM CHANGE.....	1382. (LBF)		
NOZZLE PRESSURE INTEGRAL.....	1430. (LBF)		
EXTERNAL FRICTION DRAG.....	63.60 (LBF)		
EXTERNAL PRESSURE INTEGRAL.....	998. (LBF)		
TOTAL EXTERNAL DRAG.....	1062. (LBF)	VACUUM STREAM THRUST COEFFICIENT = C8.....	0.9712
TOTAL STRUT DRAG.....	146.82 (LBF)	NOZZLE COEFFICIENT = C1.....	0.8910
CAVITY FORCE.....	1286. (LBF)	PROCESS EFFICIENCY.....	0.3153
CALCULATED LOAD CELL FORCE.....	714. (LBF)	KINETIC ENERGY EFFICIENCY.....	0.9035
MEASURED LOAD CELL FORCE.....	712. (LBF)		
FUEL VACUUM SPECIFIC IMPULSE.....	215.6		

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8.....	0.9712
NOZZLE COEFFICIENT = C1.....	0.8910
PROCESS EFFICIENCY.....	0.3153
KINETIC ENERGY EFFICIENCY.....	0.9035

STATIONS

FUEL INJECTORS

NOMINAL COMB LEADING EDGE.....	34.884 (IN)
SPIRE TRANSLATION.....	0.3966 (IN)
INLET THROAT.....	40.400 (IN)
COMB LEADING EDGE.....	35.281 (IN)
NOZZLE SHROUD TRAILING EDGE.....	73.621 (IN)
NOZZLE PLUG TRAILING EDGE.....	67.373 (IN)
STRUT LEADING EDGE.....	56.537 (IN)
STRUT TRAILING EDGE.....	65.137 (IN)
COMBUSTOR EXIT.....	65.137 (IN)

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.362	B
1C	44.300	
2A	48.857	C
2C	46.250	
3A	54.147	E
3B	56.332	
4	44.862	

Reading 34

$t = 196,25 \text{ sec.}$

A pressure measurement for specifically  
determining the outerbody cavity purge  
tare force was "off scale".

SUMMARY REPORT

	P	T	M	GAMMA	MOLIN	SUNY	MACH	VEL	S	M/A	A	A/AC	MUMIN	U	INAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	936.999	2975	601.9( 787)	1.2934	28.973	2570											
0.000	0.484	402	32.4( 96)	1.3908	28.971	982	6.000	5894	1.809	0.1330	33.390	0.9797	6238	12.189	186.8		
SPIKE TIP N8	2	0	5														
0.000	22.850	2975	601.9( 787)	1.2934	28.972	2570											
0.000	20.709	2975	602.0( 788)	1.2935	28.972	2543	0.392	497	2.064	0.13307	33.390	0.9797	6231	2.062	186.8		
WIND TUNNEL	3	0	0														
0.000	936.999	2975	601.9( 787)	1.2934	28.973	2570											
0.000	0.483	402	32.5( 96)	1.3908	28.971	982	6.002	5894	1.809	0.13288	33.341	0.9797	6229	12.172	186.8		
SPIKE TIP N8	4	0	0														
0.000	22.850	2975	601.9( 787)	1.2934	28.972	2570											
0.000	20.710	2975	602.1( 788)	1.2935	28.972	2543	0.391	995	2.064	0.13288	33.341	0.9797	6230	2.056	186.8		
INLET TURBOJET	5	0	21														
40.400	147.521	4101	1040.5(1143)	1.2536	28.961	2995											
40.400	87.351	3733	896.7(1013)	1.2693	28.969	2852	0.934	2664	2.043	1.19407	33.390	0.1092	5207	49.428	155.9		
INLET UPRAKSK	6	0	7														
40.400	147.921	4101	1050.5(1143)	1.2536	28.961	2995											
40.400	54.418	3371	783.5( 904)	1.2808	28.971	2722	1.318	3586	2.043	1.08551	33.390	0.1201	5396	60.499	161.6		
INLET DOWNKSK	7	0	4														
40.400	143.734	4101	1040.5(1143)	1.2535	28.961	2995											
40.400	99.938	3861	940.5(1052)	1.2652	28.967	2895	0.773	2237	2.044	1.08551	33.390	0.1201	5396	37.739	161.6		
COMBUSTOR	8	0	1	21													
40.400	77.160	4105	1043.4(1158)	1.2549	28.917	3018											
40.400	12.700	2771	608.8( 748)	1.3006	28.933	2824	1.848	4663	2.137	1.19708	33.468	0.1092	5206	86.750	155.5	0.07	0.07
COMBUSTOR	9	0	2	21													
40.410	77.993	4095	1043.5(1153)	1.2571	28.892	3015											
40.410	12.694	2746	608.9( 741)	1.3018	28.905	2515	1.854	4663	2.135	1.19669	33.468	0.1092	5206	86.724	155.5	0.07	0.01
COMBUSTOR	10	0	3	21													
41.394	94.617	4309	1150.3(1259)	1.2439	27.200	3129											
41.394	8.695	3064	719.0( 862)	1.2919	27.236	2688	1.727	4641	2.252	1.19886	33.553	0.1093	5090	86.472	151.7	0.15	0.04
COMBUSTOR	11	4	21														
41.404	94.775	4290	1151.7(1255)	1.2439	27.174	3128											
41.404	8.886	3041	721.1( 855)	1.2933	27.206	2681	1.732	4641	2.250	1.19917	33.553	0.1092	5089	86.496	151.7	0.15	0.01
COMBUSTOR	12	5	21														
41.409	93.122	4210	1150.1(1261)	1.2404	27.171	3135											
41.409	8.637	3062	729.3( 862)	1.2928	27.202	2690	1.726	4642	2.255	1.20078	33.553	0.1091	5082	86.624	151.5	0.15	0.00
COMBUSTOR	13	6	21														
41.500	92.882	4320	1149.9(1265)	1.2459	27.174	3130											
41.500	8.658	3076	734.0( 866)	1.2924	27.201	2696	1.721	4638	2.256	1.20071	33.553	0.1091	5079	86.550	151.4	0.15	0.00
COMBUSTOR	14	7	21														
42.400	94.936	4622	1282.5(1368)	1.2317	27.059	3237											
42.400	20.070	3697	929.0(1054)	1.2719	27.111	2921	1.442	4211	2.250	1.19123	33.639	0.1103	4970	77.962	147.7	0.15	0.00
COMBUSTOR	15	8	21														
44.100	59.223	5352	1588.9(1603)	1.1778	27.424	3393											
44.100	24.045	4735	1194.9(1397)	1.1934	27.510	3198	1.233	3945	2.329	1.14614	33.639	0.1146	4830	70.259	143.6	0.15	0.66
COMBUSTOR	16	9	21														
44.310	57.436	5175	1521.7(1551)	1.1994	26.930	3384											
44.310	23.929	4491	1211.4(1317)	1.2262	27.118	3170	1.243	3940	2.319	1.14456	33.639	0.1147	4823	70.087	143.4	0.15	0.10
COMBUSTOR	17	10	21														
44.890	54.735	5274	1585.4(1585)	1.1995	26.843	3421											
44.890	23.462	4584	1277.5(1355)	1.2299	27.030	3212	1.222	3925	2.332	1.14068	33.639	0.1151	4796	69.576	142.6	0.15	0.01
COMBUSTOR	18	11	21														
44.904	54.119	5299	1598.9(1594)	1.1977	26.827	3429											
44.904	23.341	4613	1291.4(1365)	1.2233	27.017	3223	1.217	3923	2.335	1.13933	33.639	0.1153	4740	69.453	142.4	0.15	0.00



READING = 0034 BLOCK = 184 TIME = 196.252 NACH 6.0 P1 = 936.999 T1 = 2975.2

COMBUSTOR	P	T	M	GAMMA	MOLWT	SUNV	MACH	VEL	S	W/A	W	A/AC	MURIM	G	IVAC	PMJ	ETAC
46.200	49.091	5390	1640.0	(1623)	1.1801	26.813	3443										
46.200	21.752	4766	1335.2	(1414)	1.2045	27.063	3246	1.202	3905	2.355	1.07555	33.639	0.1221	4763	65.268	141.0	0.15 0.15
COMBUSTOR	0	20	13	21													
47.310	47.868	5228	1566.5	(1570)	1.1981	26.950	3406										
47.310	20.522	4546	1261.4	(1343)	1.2240	27.038	3199	1.222	3907	2.339	1.00024	33.639	0.1313	4776	60.736	142.0	0.15 0.02
COMBUSTOR	0	21	14	21													
47.429	49.254	5214	1598.3	(1565)	1.2002	26.958	3404										
47.429	21.362	4532	1257.8	(1336)	1.2271	27.032	3198	1.212	3877	2.334	0.99156	33.639	0.1325	4778	59.747	142.0	0.15 0.00
COMBUSTOR	0	22	15	21													
48.110	57.266	5221	1510.0	(1564)	1.1912	27.040	3362										
48.110	27.490	4652	1244.7	(1374)	1.2107	27.830	3207	1.136	3643	2.322	0.93128	33.639	0.1410	4802	52.723	142.7	0.15 0.28
COMBUSTOR	0	23	16	21													
48.869	52.435	4671	1459.7	(1612)	1.2261	23.105	3511										
48.869	26.026	4104	1201.4	(1394)	1.2515	23.165	3320	1.043	3595	2.588	0.85847	34.126	0.1552	4873	47.990	142.8	0.59 0.07
COMBUSTOR	0	24	17	21													
48.879	53.603	4567	1459.0	(1574)	1.2392	22.998	3498										
48.879	26.709	4974	1201.0	(1348)	1.2640	23.036	3293	1.091	3593	2.577	0.85736	34.126	0.1554	4874	47.874	142.8	0.59 0.01
COMBUSTOR	0	25	18	21													
49.409	56.989	4471	1420.3	(1338)	1.2468	22.994	3472										
49.409	28.987	3696	1176.2	(1319)	1.2694	23.020	3268	1.069	3495	2.562	0.80184	34.126	0.1662	4840	43.547	144.8	0.59 0.00
COMBUSTOR	0	26	19	21													
52.919	58.226	3819	1147.0	(1293)	1.2743	22.957	3246										
52.919	23.062	4108	870.1	(1028)	1.2977	22.961	2959	1.260	3722	2.499	0.56157	34.215	0.2379	5364	32.466	156.8	0.59 0.00
COMBUSTOR	0	27	20	21													
53.419	59.518	3713	1105.7	(1293)	1.2788	22.955	3207										
53.419	22.237	2978	822.5	(981)	1.3020	22.958	2898	1.294	3765	2.487	0.53862	34.215	0.2489	5416	31.519	158.3	0.59 0.00
COMBUSTOR	0	28	21	21													
54.159	54.837	3448	1061.4	(1270)	1.2880	20.810	3257										
54.159	24.737	2873	821.6	(1037)	1.3072	20.812	2995	1.156	3464	2.666	0.52142	34.572	0.2629	5387	27.833	153.8	0.91 0.03
COMBUSTOR	0	29	22	21													
54.169	55.940	3365	1060.5	(1237)	1.2927	20.741	3229										
54.169	24.771	2785	821.1	(1003)	1.3114	20.742	2959	1.170	3461	2.656	0.51303	34.572	0.2631	5389	27.597	155.9	0.91 0.00
COMBUSTOR	0	30	23	21													
54.929	59.058	3199	995.9	(1170)	1.2985	20.731	3156										
54.929	27.337	2669	779.8	(958)	1.3154	20.732	2902	1.133	3289	2.624	0.48515	34.572	0.2762	5492	24.792	158.6	0.91 0.00
COMBUSTOR	0	31	24	4													
55.769	59.186	3210	923.6	(1171)	1.2947	20.886	3145										
55.769	24.841	2738	738.1	(981)	1.3105	20.886	2922	1.065	3111	2.626	0.45833	34.572	0.2905	5544	22.160	161.0	0.91 0.05
COMBUSTOR	0	32	25	5													
56.354	52.254	3929	871.0	(1447)	1.2519	21.635	3362										
56.354	31.629	3548	695.8	(1289)	1.2683	21.648	3213	0.914	2935	2.689	0.36691	34.572	0.3674	6134	16.735	177.4	0.91 0.28
COMBUSTOR	0	33	26	3													
56.409	52.060	3964	868.0	(1461)	1.2493	21.679	3370										
56.409	30.128	3546	678.0	(1282)	1.2674	21.695	3209	0.956	3068	2.691	0.36594	34.572	0.3689	6143	17.445	177.7	0.91 0.24
COMBUSTOR	0	34	27	3													
56.509	51.871	3908	833.5	(1472)	1.2469	21.734	3375										
56.509	30.339	3583	687.9	(1302)	1.2668	21.751	3218	0.947	3047	2.691	0.36318	34.572	0.3717	6163	17.199	178.2	0.91 0.31
COMBUSTOR	0	35	28	11													
56.629	52.747	3983	846.3	(1467)	1.2475	21.739	3371										
56.629	32.457	3610	678.0	(1313)	1.2637	21.755	3229	0.849	2903	2.688	0.36738	34.572	0.3674	6173	16.572	176.6	0.91 0.31
COMBUSTOR	0	36	29	4													
56.909	52.987	4024	821.1	(1462)	1.2439	21.833	3376										
56.909	33.300	3668	656.6	(1334)	1.2547	21.850	3242	0.879	2851	2.687	0.36004	34.572	0.3688	6209	16.218	179.6	0.91 0.34
COMBUSTOR	0	37	30	3													
57.135	53.263	4048	800.5	(1491)	1.2410	21.902	3374										
57.135	34.113	3707	683.9	(1349)	1.2568	21.920	3251	0.891	2794	2.686	0.36541	34.572	0.3694	6246	15.898	180.4	0.91 0.36

READING = 0034 BLOCK = 184 TIME = 196.252 MACH 6.0 PI = 436.994 TI = 29/5.2

	P	T	M	GAHMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/AC	FOURTH	IVAC	PMI	ETAC
COMBUSTOR	0	30	31	4												
50.879	54.880	3965	630.2	(1450)	1.2424	22.182	5323									
50.879	40.367	3735	552.5	(1355)	1.2525	22.194	5236	0.711	2300	0.009	0.5575	3.572	0.3711	0.571	0.91	0.91
COMBUSTOR	0	39	32	5												
60.889	55.836	4148	443.5	(1511)	1.2246	22.619	5327									
60.889	39.800	3890	521.5	(1404)	1.2364	22.842	5235	0.765	2470	2.638	0.36983	34.572	0.3650	6337	14.196	185.3 0.91 0.91
COMBUSTOR	0	40	33	5												
62.309	56.350	4315	301.1	(1569)	1.2088	23.543	5333									
62.309	37.331	4018	155.2	(1405)	1.2228	23.384	5232	0.836	2702	2.622	0.37485	34.572	0.3553	6301	15.944	182.3 0.91 0.91
COMBUSTOR	0	41	34	5												
64.773	53.154	4345	55.9	(1568)	1.1964	23.998	5284									
64.773	23.842	3789	213.5	(1337)	1.2262	24.081	5097	1.186	3672	2.585	0.36006	34.572	0.3749	6235	20.548	180.3 0.91 0.92
COMBUSTOR	0	42	35	4												
65.149	48.736	4420	19.5	(1596)	1.1869	24.178	5287									
65.149	24.617	3959	215.2	(1403)	1.2132	24.276	5136	1.093	3427	2.588	0.33473	34.572	0.4032	6225	17.826	180.0 0.91 0.97
COMBUSTOR	0	43	36	21												
65.149	48.736	5167	594.0	(1923)	1.1477	23.553	5538									
65.149	15.655	4525	134.1	(1643)	1.1636	24.002	5303	1.653	4797	2.705	0.33473	34.572	0.4032	6772	24.956	195.9 0.91 0.97
NOZZLE	AE	44	37	5												
67.385	48.736	4420	19.5	(1345)	1.1869	24.178	5287									
67.385	1.442	2237	422.4	(725)	1.2843	24.335	5423	2.834	6865	2.588	0.06968	34.572	1.9371	8092	7.434	234.1 0.91 0.97
NOZZLE	PO	45	38	5												
67.385	48.736	4420	19.5	(1345)	1.1869	24.178	5287									
67.385	0.484	1744	1099.1	(549)	1.3804	24.336	5158	3.467	7481	2.588	0.03270	34.572	4.1283	8551	3.801	247.3 0.91 0.97
NOZZLE	AE	46	39	5												
67.385	48.736	5167	594.0	(1923)	1.1477	23.553	5538									
67.385	1.890	3216	519.1	(1102)	1.2445	24.324	5880	2.633	7532	2.705	0.06968	34.572	1.9371	9031	8.156	261.2 0.91 0.97
NOZZLE	PO	47	40	8												
67.385	48.736	5167	594.0	(1923)	1.1477	23.553	5538									
67.385	0.484	2425	852.2	(795)	1.2770	24.335	5515	3.382	8507	2.705	0.02674	34.572	5.0279	9767	3.535	282.5 0.91 0.97
FICTIVE COMBUSTOR	66	59	0													
65.149	147.521	4554	19.5	(1649)	1.1928	24.328	5332									
65.149	0.484	1388	1269.8	(426)	1.3258	24.475	5933	4.155	8052	2.495	0.04437	34.572	3.0420	4008	5.539	269.2 0.91 1.00
FICTIVE NOZZLE	67	60	0													
67.385	19.462	4962	505.7	(1836)	1.1429	23.547	5460									
67.385	2.968	1942	192.4	(1397)	1.1868	24.200	5109	1.907	5911	2.705	0.06968	34.572	1.9371	7824	9.401	226.1 0.91 0.97

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[illegible]

XASS	P-10	P-09	PDA	UUA	U-16	S-12	U-ALL	P-16/P-09	P-16/P-10	M-09/P-09	M-09/P-10
6.519E 01	2.745E 01	2.156E 01	6.371E 02	-2.307E 04	-2.508E 03	-2.132E 04	4.293E 03	5.671E 01	2.930E-02	4.455E 01	2.301E-02
6.539E 01	2.582E 01	2.047E 01	6.371E 02	-2.453E 04	-2.501E 03	-2.107E 04	4.319E 03	5.533E 01	2.755E-02	4.229E 01	2.185E-02
6.705E 01	1.226E 01	1.092E 01	1.026E 03	-2.443E 04	-2.659E 03	-2.677E 04	4.535E 03	4.533E 01	1.500E-02	4.250E 01	1.165E-02
6.772E 01	9.128E 00	1.070E 01	1.244E 03	-3.112E 04	-2.695E 03	-2.805E 04	4.514E 03	1.668E 01	4.742E-03	2.211E 01	1.142E-02
6.889E 01	5.530E 00	6.650E 00	1.476E 03	-3.307E 04	-2.734E 03	-3.034E 04	4.711E 03	1.142E 01	5.902E-03	1.787E 01	9.231E-03
6.921E 01	4.783E 00	6.730E 00	1.639E 03	-3.449E 04	-2.766E 03	-3.235E 04	4.749E 03	9.681E 00	5.105E-03	1.390E 01	7.183E-03
6.932E 01	4.150E 00	5.842E 00	1.755E 03	-3.479E 04	-2.791E 03	-3.200E 04	4.873E 03	6.573E 00	4.424E-03	1.207E 01	6.235E-03
7.077E 01	3.104E 00	4.860E 00	1.892E 03	-3.151E 04	-2.824E 03	-2.869E 04	4.887E 03	6.412E 00	3.312E-03	4.214E 00	4.760E-03
7.120E 01	2.630E 00	4.072E 00	1.942E 03	-3.000E 04	-2.838E 03	-2.716E 04	5.039E 03	5.433E 00	2.807E-03	8.412E 00	4.345E-03
7.273E 01	2.661E 00	2.690E 00	2.084E 03	-2.362E 04	-2.880E 03	-2.074E 04	5.224E 03	5.496E 00	2.839E-03	5.557E 00	2.871E-04
7.303E 01	2.678E 00	8.200E-01	2.165E 03	-1.789E 04	-2.901E 03	-1.499E 04	5.323E 03	5.533E 00	2.854E-03	1.694E 00	8.751E-04
7.333E 01	2.679E 00	8.117E-01	2.167E 03	-1.786E 04	-2.902E 03	-1.496E 04	5.324E 03	5.534E 00	2.854E-03	1.677E 00	8.635E-04
7.496E 01	2.705E 00	0.000	2.224E 03	-6.731E 03	-2.929E 03	-3.802E 03	5.375E 03	5.588E 00	2.887E-03	0.000	0.000
7.701E 01	2.060E 00	0.000	2.319E 03	-6.779E 03	-2.977E 03	-3.802E 03	5.474E 03	4.256E 00	2.199E-03	0.000	0.000
8.171E 01	1.795E 00	0.000	2.402E 03	-6.826E 03	-3.024E 03	-3.802E 03	5.579E 03	3.708E 00	1.916E-03	0.000	0.000
8.452E 01	1.885E 00	0.000	2.440E 03	-6.866E 03	-3.066E 03	-3.802E 03	5.633E 03	3.440E 00	1.777E-03	0.000	0.000
8.738E 01	2.585E 00	0.000	2.491E 03	-6.926E 03	-3.126E 03	-3.802E 03	5.656E 03	5.340E 00	2.759E-03	0.000	0.000
8.738E 01	2.587E 00	0.000	2.491E 03	-6.940E 03	-3.126E 03	-3.802E 03	5.656E 03	5.344E 00	2.761E-03	0.000	0.000

HEADING = 0034 BLOCK = 184 TIME = 196.252 MAG 6.0 PI = 936.999 II = 2975.2

X	UDKAG	CURAG	CF	MC
4.000E 01	1.575E 02	1.575E 02	3.142E-03	8.737E-02
4.001E 01	2.223E-01	1.577E 02	3.265E-03	2.908E-02
4.002E 01	4.530E-02	1.577E 02	3.265E-03	2.908E-02
4.003E 01	3.087E 01	1.926E 02	3.657E-03	2.120E-02
4.004E 01	3.693E-01	1.930E 02	3.657E-03	2.120E-02
4.005E 01	2.430E 00	1.954E 02	3.593E-03	2.114E-02
4.006E 01	1.166E 00	1.966E 02	3.599E-03	2.114E-02
4.007E 01	3.332E 01	2.301E 02	3.500E-03	3.601E-02
4.008E 01	5.563E 01	2.659E 02	3.700E-03	3.720E-02
4.009E 01	3.641E 00	4.898E 02	3.833E-03	3.537E-02
4.010E 01	1.543E 01	3.057E 02	3.800E-03	3.531E-02
4.011E 01	3.345E 00	3.091E 02	3.799E-03	3.513E-02
4.012E 01	4.291E 01	3.520E 02	3.846E-03	3.237E-02
4.013E 01	3.140E 01	3.634E 02	3.813E-03	3.045E-02
4.014E 01	3.364E 00	3.668E 02	3.767E-03	3.148E-02
4.015E 01	1.766E 01	4.044E 02	3.637E-03	3.752E-02
4.016E 01	1.779E 01	4.222E 02	3.811E-03	3.727E-02
4.017E 01	2.220E-01	4.225E 02	3.596E-03	4.021E-02
4.018E 01	1.075E 01	4.332E 02	3.461E-03	4.266E-02
4.019E 01	5.555E 01	4.886E 02	3.103E-03	3.902E-02
4.020E 01	6.857E 00	4.950E 02	3.034E-03	3.878E-02
4.021E 01	8.773E 00	5.038E 02	3.242E-03	3.845E-02
4.022E 01	1.109E-01	5.039E 02	3.041E-03	4.160E-02
4.023E 01	7.823E 00	5.115E 02	2.936E-03	4.449E-02
4.024E 01	3.614E 00	5.188E 02	2.857E-03	4.668E-02
4.025E 01	3.614E 00	5.216E 02	2.820E-03	4.423E-02
4.026E 01	3.559E-01	5.220E 02	3.092E-03	3.911E-02
4.027E 01	5.528E-01	5.229E 02	3.098E-03	3.899E-02
4.028E 01	5.122E-01	5.235E 02	3.523E-03	3.341E-02
4.029E 01	1.938E 00	5.254E 02	3.105E-03	3.974E-02
4.030E 01	1.441E 00	5.269E 02	3.120E-03	3.962E-02
4.031E 01	9.936E 00	5.366E 02	3.085E-03	3.985E-02
4.032E 01	1.053E 01	5.474E 02	2.984E-03	4.277E-02
4.033E 01	8.237E 00	5.556E 02	3.030E-03	4.264E-02
4.034E 01	1.709E 01	5.727E 02	2.896E-03	3.890E-02
4.035E 01	2.788E 00	5.755E 02	3.125E-03	3.552E-02
4.036E 01	2.920E-01	5.758E 02	3.247E-03	3.571E-02
4.037E 01	1.507E 00	5.773E 02	3.232E-03	3.515E-02
4.038E 01	1.278E 01	5.901E 02	3.097E-03	2.542E-02
4.039E 01	4.711E 00	5.948E 02	3.071E-03	2.504E-02
4.040E 01	5.027E 00	5.998E 02	3.019E-03	1.850E-02
4.041E 01	4.180E 00	6.040E 02	2.987E-03	1.808E-02
4.042E 01	3.246E 00	6.072E 02	2.965E-03	1.456E-02
4.043E 01	4.521E 00	6.118E 02	2.925E-03	1.142E-02
4.044E 01	1.848E 00	6.136E 02	2.908E-03	1.041E-02
4.045E 01	5.944E 00	6.196E 02	2.872E-03	9.210E-03
4.046E 01	3.666E 00	6.222E 02	2.815E-03	6.610E-03
4.047E 01	3.788E-03	6.222E 02	2.815E-03	6.606E-03
4.048E 01	1.289E 00	6.236E 02	2.862E-03	9.246E-03
4.049E 01	2.743E 00	6.264E 02	2.814E-03	7.445E-03
4.050E 01	2.576E 00	6.289E 02	2.778E-03	6.701E-03
4.051E 01	1.247E 00	6.302E 02	2.756E-03	6.295E-03
4.052E 01	5.796E-01	6.308E 02	2.798E-03	8.747E-03
4.053E 01	0.000	6.310E 02	2.798E-03	6.752E-03

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RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST.....	1500. (LBF)	ANGLE OF ATTACK.....	0.000 (DEGREES)
MEASURED THRUST.....	2302. (LBF)	MASS FLOW RATIO.....	0.9797
CALCULATED SPECIFIC IMPULSE.....	1536. (LBF-SEC/LBM)	ADDITIONAL DRAG COEFFICIENT.....	0.0008
MEASURED SPECIFIC IMPULSE.....	2237. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1487
CALCULATED THRUST COEFFICIENT.....	0.5061	DELTA PT.....	0.2980 (P81)
MEASURED THRUST COEFFICIENT.....	0.7374	TOTAL PRESSURE RECOVERY - SUPERSONIC.....	0.1574
		TOTAL PRESSURE RECOVERY - SUBSONIC.....	0.1534
REGENERATIVE-COOLED ENGINE PERFORMANCE			
CALCULATED			
STREAM THRUST.....	6732. (LBF)	INLET PROCESS EFFICIENCY - SUPERSONIC.....	0.8301
NET THRUST.....	2488. (LBF)	INLET PROCESS EFFICIENCY - SUBSONIC.....	0.8352
SPECIFIC IMPULSE.....	2418. (LBF-SEC/LBM)	KINETIC ENERGY EFFICIENCY - SUPERSONIC.....	1.3175
THRUST COEFFICIENT.....	0.7970	KINETIC ENERGY EFFICIENCY - SUBSONIC.....	1.3148
		ENTHALPY AT PU - SUPERSONIC.....	125.27 (BTU/LBM)
		ENTHALPY AT PO - SUPERSONIC.....	127.64 (BTU/LBM)

COMBUSTOR

MOMENTUM AND FORCES

INLET FRICTION DRAG.....	197.8 (LBF)	FUEL-AIR RATIO.....	0.6307
INLET MOMENTUM CHANGE.....	99408 (LBF)	EQUIVALENCE RATIO.....	0.906
COMBUSTOR FRICTION DRAG.....	418.0 (LBF)	COMBUSTOR EFFICIENCY.....	0.968
COMBUSTOR STRUT DRAG.....	170.51 (LBF)	TOTAL PRESSURE RATIO.....	0.3304
COMBUSTOR MOMENTUM CHANGE.....	1018. (LBF)	COMBUSTOR EFFECTIVENESS.....	0.8790
NOZZLE FRICTION DRAG.....	55.26 (LBF)	INJECTOR DISCHARGE COEFFICIENTS 13.2670	
NOZZLE STRUT DRAG.....	0.00 (LBF)		
NOZZLE MOMENTUM CHANGE.....	1599. (LBF)		
NOZZLE PRESSURE INTEGRAL.....	1654. (LBF)		
EXTERNAL FRICTION DRAG.....	73.97 (LBF)		
EXTERNAL PRESSURE INTEGRAL.....	1217. (LBF)		
TOTAL EXTERNAL DRAG.....	1291. (LBF)		
TOTAL STRUT DRAG.....	170.51 (LBF)		
CAVITY FORCE.....	1346. (LBF)		
CALCULATED LOAD CELL FORCE.....	1056. (LBF)		
MEASURED LOAD CELL FORCE.....	1334. (LBF)		
FUEL VACUUM SPECIFIC IMPULSE.....	307.0		

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - C8.....	0.9668
NOZZLE COEFFICIENT - C1.....	0.8868
PROCESS EFFICIENCY.....	0.8433
KINETIC ENERGY EFFICIENCY.....	0.8737

STATIONS

FUEL INJECTIONS

NOMINAL CONUL LEADING EDGE.....	34.884 (IN)	INJECTORS	STATION	VALVE
SPINE TRANSLATION.....	0.4086 (IN)	1A	40.400	A
INLET THROAT.....	40.400 (IN)	1B	41.394	B
CONUL LEADING EDGE.....	35.293 (IN)	1C	44.300	
NOZZLE SHROUD TRAILING EDGE.....	73.623 (IN)	2A	48.869	D
NOZZLE PLUG TRAILING EDGE.....	67.383 (IN)	2C	48.250	
STRUT LEADING EDGE.....	56.549 (IN)	3A	54.159	E
STRUT TRAILING EDGE.....	65.149 (IN)	3B	56.344	
COMBUSTOR EXIT.....	65.149 (IN)	4	44.694	

Reading 36

$t = 132,68 \text{ sec.}$

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[illegible]



READING = 0036 BLOCK = 100 TIME = 132.684 MACH 6.0 PT = 748.949 IF = 2973.8

P	1	H	GAMMA	MOLMT	SONY	MACH	VEL	S	M/A	M	A/C	MONTM	M	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	21												
46.260	104.349	2581	620.1	1.3117	25.092	2590										
46.260	15.350	1604	307.4	1.3479	25.092	2070	1.911	3956	2.149	0.86218	27.047	0.1225	3807	53.006	140.8	0.35 0.00
COMBUSTOR	0	20	13	21												
47.310	104.233	2557	614.5	1.3125	25.085	2579										
47.310	15.216	1593	306.2	1.3485	25.085	2063	1.904	3928	2.146	0.80181	27.047	0.1317	3826	48.987	141.4	0.35 0.00
COMBUSTOR	0	21	14	21												
47.409	104.300	2554	614.0	1.3126	25.084	2578										
47.409	15.206	1591	305.8	1.3486	25.084	2062	1.904	3927	2.146	0.79620	27.047	0.1326	3828	48.993	141.5	0.35 0.00
COMBUSTOR	0	22	15	21												
48.110	67.723	3132	610.4	1.2855	25.681	2792										
48.110	14.769	2200	298.7	1.3175	25.682	2369	1.667	3949	2.231	0.74666	27.047	0.1414	3855	45.821	142.5	0.35 0.32
COMBUSTOR	0	23	16	21												
48.849	84.015	2592	611.4	1.3117	23.799	2665										
48.849	14.633	1688	305.3	1.3447	23.799	2178	1.797	3913	2.244	0.68398	27.189	0.1592	3897	41.598	143.3	0.51 0.06
COMBUSTOR	0	24	17	21												
48.859	93.209	2470	611.4	1.3173	23.686	2613										
48.859	14.624	1557	305.3	1.3521	23.686	2102	1.861	3914	2.241	0.68309	27.189	0.1554	3897	41.546	143.3	0.51 0.01
COMBUSTOR	0	25	18	21												
49.389	93.967	2445	609.1	1.3183	23.670	2602										
49.389	14.362	1524	300.9	1.3539	23.670	2082	1.886	3927	2.237	0.63885	27.189	0.1642	3930	36.990	144.5	0.51 0.00
COMBUSTOR	0	26	19	21												
50.799	77.390	2427	603.8	1.3190	23.667	2593										
50.799	6.525	1292	228.0	1.3661	23.667	1925	2.252	4336	2.250	0.54847	27.189	0.1950	3990	36.692	146.8	0.51 0.00
COMBUSTOR	0	27	20	21												
52.899	78.113	2406	596.7	1.3197	23.667	2583										
52.899	6.937	1297	229.9	1.3658	23.667	1929	2.220	4284	2.247	0.44626	27.189	0.2379	4043	29.710	148.7	0.51 0.00
COMBUSTOR	0	28	21	21												
53.399	49.381	2748	595.1	1.3039	23.988	2723										
53.399	5.850	1624	215.0	1.3454	23.988	2131	2.045	4359	2.322	0.42802	27.189	0.2480	4055	28.994	149.1	0.51 0.14
COMBUSTOR	0	29	22	4												
54.149	65.939	2581	592.3	1.3115	23.838	2657										
54.149	10.935	1653	279.0	1.3458	23.838	2155	1.836	3957	2.281	0.40347	27.189	0.2631	4081	24.812	150.1	0.51 0.07
COMBUSTOR	0	30	23	4												
54.520	55.879	2816	590.8	1.3006	24.064	2751										
54.520	13.453	2092	309.7	1.3290	24.064	2145	1.600	3750	2.318	0.39241	27.189	0.2705	4101	22.870	150.8	0.51 0.17
COMBUSTOR	0	31	24	4												
54.909	50.056	3043	589.0	1.2898	24.290	2834										
54.909	16.087	2338	340.2	1.3180	24.291	2508	1.407	3528	2.346	0.38150	27.189	0.2782	4127	20.917	151.8	0.51 0.26
COMBUSTOR	0	32	28	4												
55.760	45.819	3294	584.3	1.2771	24.556	2918										
55.760	18.151	2677	361.2	1.2989	24.556	2653	1.259	3341	2.371	0.33997	27.189	0.2949	4194	18.691	154.3	0.51 0.37
COMBUSTOR	0	33	26	5												
56.334	38.738	4060	580.9	1.2294	25.403	3123										
56.334	19.542	3539	377.2	1.2528	25.418	2952	1.081	3192	2.424	0.28050	27.189	0.3679	4539	14.312	166.9	0.51 0.71
COMBUSTOR	0	34	27	2												
56.389	38.733	4061	580.5	1.2293	25.406	3126										
56.389	19.136	3547	371.3	1.2534	25.441	2947	1.098	3235	2.424	0.28769	27.189	0.3690	4544	14.465	167.1	0.51 0.71
COMBUSTOR	0	35	28	3												
56.529	38.548	4091	579.7	1.2271	25.443	3132										
56.529	19.326	3566	372.9	1.2509	25.481	2959	1.087	3216	2.426	0.28577	27.189	0.3715	4556	14.283	167.6	0.51 0.73
COMBUSTOR	0	36	30	4												
56.609	38.957	4118	579.2	1.2252	25.476	3138										
56.609	20.209	3638	380.9	1.2480	25.515	2974	1.059	3150	2.426	0.28892	27.189	0.3674	4563	14.142	167.8	0.51 0.74
COMBUSTOR	0	37	30	4												
56.889	38.974	4171	577.4	1.2211	25.543	3149										
56.889	20.887	3715	386.3	1.2432	25.587	2996	1.032	3092	2.428	0.28787	27.189	0.3688	4586	13.834	168.7	0.51 0.77

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READING = 0036 BLOCK = 100 TIME = 132.684 MACH 6.0 PT = 748.999 TT = 2973.8

	P	J	M	GAMMA	MOLNI	SONV	MACH	VEL	S	N/A	M	A/C	MOMTH	U	IVAC	PHI	ETAC
COMBUSTOR	0	38	31														
57.115	39.004	4209	576.0	1.2183	25.592	3156											
57.115	21.393	3769	389.9	1.2397	25.639	3010	1.014	3052	2.429	0.28733	27.189	0.3695	4603	13.626	164.3	0.51	0.79
COMBUSTOR	0	39	32														
57.839	36.029	4299	571.6	1.2112	25.713	3173											
57.839	23.012	3918	404.8	1.2300	25.366	3042	0.947	2888	2.431	0.28888	27.189	0.3753	4692	12.696	171.1	0.51	0.84
COMBUSTOR	0	40	33														
58.059	39.005	4368	565.9	1.2057	25.813	3105											
58.059	23.700	4008	404.8	1.2234	25.873	3070	0.925	2839	2.432	0.28107	27.189	0.3777	4692	12.400	172.6	0.51	0.89
COMBUSTOR	0	41	34														
60.069	40.179	4335	555.8	1.2082	25.805	3177											
60.069	23.000	3960	389.8	1.2267	25.862	3056	0.942	2879	2.427	0.29085	27.189	0.3650	4667	13.015	171.7	0.51	0.88
COMBUSTOR	0	42	35														
62.289	41.047	4301	548.4	1.2109	25.705	3169											
62.289	21.675	3839	348.4	1.2335	25.846	3018	1.008	3163	2.423	0.29873	27.189	0.3553	4646	14.685	170.8	0.51	0.87
COMBUSTOR	0	43	36														
64.753	38.994	4162	535.2	1.2205	25.659	3137											
64.753	17.955	3600	302.5	1.2474	25.709	2947	1.158	3412	2.420	0.28316	27.189	0.3749	4608	15.016	164.3	0.51	0.81
COMBUSTOR	0	44	37														
65.129	35.084	4204	533.0	1.2164	25.716	3144											
65.129	18.181	3713	325.8	1.2406	25.769	2981	1.081	3223	2.428	0.26325	27.189	0.4032	4602	13.187	164.3	0.51	0.84
COMBUSTOR	0	45	38														
65.129	35.084	4393	623.2	1.2049	25.671	3201											
65.129	22.080	4063	473.2	1.2210	25.730	3096	0.885	2740	2.449	0.26325	27.189	0.4032	4658	11.208	171.3	0.51	0.84
NOZZLE	AE	46	39														
87.365	35.084	4204	533.0	1.2164	25.716	3144											
87.365	1.009	1877	204.8	1.3105	25.796	2233	2.880	6436	2.428	0.05480	27.189	1.9371	5939	5.481	218.5	0.51	0.84
NOZZLE	P0	47	40														
87.365	35.084	4204	533.0	1.2164	25.716	3144											
87.365	0.387	1567	423.2	1.3101	25.796	2404	3.455	6925	2.428	0.012852	27.189	3.7214	6220	3.070	228.8	0.51	0.84
NOZZLE	AE	48	41														
87.365	35.084	4393	623.2	1.2045	25.671	3201											
87.365	1.064	2135	243.2	1.3042	25.796	2317	2.882	6584	2.449	0.05480	27.189	1.9371	6092	5.408	224.1	0.51	0.84
NOZZLE	P0	49	42														
87.365	35.084	4393	623.2	1.2045	25.671	3201											
87.365	0.387	1676	391.2	1.3243	25.796	2068	3.455	7125	2.449	0.02744	27.189	3.8680	6404	3.039	233.5	0.51	0.84
PICTIVE	COMBUSTOR	70	63														
65.129	241.069	4566	533.0	1.2102	26.150	3241											
65.129	0.387	1094	708.9	1.3553	26.249	1676	4.704	7883	2.288	0.04734	27.189	2.2422	6884	5.800	253.2	0.51	1.00
PICTIVE	NOZZLE	71	64														
87.365	20.088	4190	533.2	1.2112	25.701	3133											
87.365	1.370	2830	144.4	1.2930	25.795	2461	2.366	5823	2.473	0.05480	27.189	1.9371	5600	4.950	206.0	0.51	0.84

READING = 0036 BLOCK = 100 TIME = 132.684 MACH 6.0 PT = 748.999 IT = 2973.8

XABS	P-IN	P-OUT	PDA	GDX	DAWALL	CAMALL
6.981400E-01	2.234999E-00	0.000000	-4.412730E-01	0.000000	2.470292E-02	2.470292E-02
3.070000E-01	2.234999E-00	0.000000	-2.551222E-02	0.000000	4.563589E-02	4.563589E-02
3.507999E-01	3.991874E-00	0.000000	-4.568498E-02	0.000000	1.751353E-02	0.315188E-02
3.526662E-01	4.014955E-00	5.725784E-00	-5.287409E-02	0.000000	8.243097E-00	6.397617E-02
3.527263E-01	4.015698E-00	5.706104E-00	-5.286232E-02	0.000000	2.666880E-01	6.400283E-02
3.534999E-01	4.049999E-00	5.77775E-00	-5.335655E-02	0.000000	2.781345E-01	6.678416E-02
3.593863E-01	4.036568E-00	3.524997E-00	-5.408379E-02	-4.199917E-02	3.951060E-01	7.073521E-02
3.606000E-01	4.034999E-00	4.004089E-00	-5.517156E-02	-4.228992E-02	1.241762E-01	7.197895E-02
3.648000E-01	4.250747E-00	5.661972E-00	-5.666185E-02	-4.332119E-02	4.351694E-01	7.632864E-02
3.700999E-01	4.159999E-00	7.754074E-00	-5.848494E-02	-4.512129E-02	5.611101E-01	8.193972E-02
3.707863E-01	4.190367E-00	8.024998E-00	-5.870930E-02	-4.533623E-02	7.304189E-00	8.267034E-02
3.739864E-01	4.380997E-00	7.999996E-00	-5.980173E-02	-4.635029E-02	3.433617E-01	8.610393E-02
3.792663E-01	4.682350E-00	1.215000E-01	-6.166821E-02	-4.808394E-02	5.782069E-01	9.188599E-02
3.803000E-01	4.739999E-00	1.198967E-01	-6.185090E-02	-4.842463E-02	1.120162E-01	9.300613E-02
3.841864E-01	4.653201E-00	1.137898E-01	-6.289023E-02	-4.983516E-02	4.338274E-01	9.734438E-02
3.875000E-01	7.913893E-00	1.408936E-01	-6.378757E-02	-5.119771E-02	3.755542E-01	1.010999E-03
3.888864E-01	8.528055E-00	1.522499E-01	-6.393360E-02	-5.151448E-02	1.578884E-01	1.026782E-03
3.900999E-01	9.059998E-00	1.534094E-01	-6.399331E-02	-5.237017E-02	1.571828E-01	1.040500E-03
3.939864E-01	1.563525E-01	1.573748E-01	-6.505337E-02	-5.434443E-02	4.486763E-01	1.085168E-03
3.950000E-01	1.734998E-01	1.500502E-01	-6.553021E-02	-5.489868E-02	1.176041E-01	1.097128E-03
3.988864E-01	1.803737E-01	1.220000E-01	-6.752041E-02	-5.719521E-02	4.521927E-01	1.142147E-03
4.000000E-01	1.834344E-01	1.018978E-01	-6.817302E-02	-5.790449E-02	1.308362E-01	1.155385E-03
4.038864E-01	1.943672E-01	3.174998E-00	-7.143235E-02	-6.050037E-02	4.558032E-01	1.200966E-03
4.040999E-01	1.950276E-01	3.192200E-00	-7.157451E-02	-6.057866E-02	1.298463E-01	1.202264E-03
4.043736E-01	2.284402E-01	4.667582E-00	-7.166536E-02	-6.064792E-02	1.179443E-00	1.203444E-03
4.138362E-01	2.251494E-01	4.682724E-00	-8.112200E-02	-6.837793E-02	1.138823E-02	1.174262E-03
4.144864E-01	2.271609E-01	4.781288E-00	-8.121288E-02	-6.948975E-02	1.172338E-02	1.138598E-03
4.150000E-01	2.282498E-01	4.931172E-00	-8.228369E-02	-7.022834E-02	7.736908E-00	1.326335E-03
4.245999E-01	2.350999E-01	7.744186E-00	-8.561920E-02	-7.082532E-02	6.109598E-00	1.332744E-03
4.416864E-01	1.864857E-01	1.274998E-01	-9.561499E-02	-8.370554E-02	1.148681E-02	1.447312E-03
4.420998E-01	1.82312E-01	1.289588E-01	-9.590854E-02	-8.109592E-02	2.067552E-02	1.654067E-03
4.479999E-01	1.863748E-01	1.340033E-01	-9.661833E-02	-1.169228E-02	1.716321E-01	1.671230E-03
4.488362E-01	1.677780E-01	1.348688E-01	-9.668628E-02	-1.189309E-03	5.979526E-01	1.731025E-03
4.625000E-01	1.842304E-01	1.489396E-01	-9.751693E-02	-1.201445E-03	1.021247E-01	1.741238E-03
4.625999E-01	1.579990E-01	1.490428E-01	-9.751472E-02	-1.399430E-03	1.678853E-02	1.909123E-03
4.731000E-01	1.504686E-01	1.598589E-01	-9.751472E-02	-1.400677E-03	1.241447E-00	1.910364E-03
4.730863E-01	1.492549E-01	1.608748E-01	-9.751472E-02	-1.533159E-03	1.301617E-02	2.040526E-03
4.810999E-01	1.402650E-01	1.547646E-01	-9.751472E-02	-1.557491E-03	1.217731E-01	2.052703E-03
4.848863E-01	1.483295E-01	1.483295E-01	-8.735432E-02	-1.664947E-03	8.746872E-01	2.140172E-03
4.858863E-01	1.482423E-01	1.482423E-01	-8.198334E-02	-1.737897E-03	9.241173E-01	2.232583E-03
4.938864E-01	1.436249E-01	1.436249E-01	-8.190608E-02	-1.759087E-03	1.251184E-00	2.233854E-03
5.079863E-01	6.524996E-00	6.524996E-00	-7.787439E-02	-1.819566E-03	6.646273E-01	2.300317E-03
5.238864E-01	6.937497E-00	6.937497E-00	-7.015327E-02	-1.964864E-03	1.775535E-02	2.777870E-03
5.398864E-01	5.849996E-00	5.849996E-00	-6.274125E-02	-2.158843E-03	2.662799E-02	2.744168E-03
5.414864E-01	1.093506E-01	1.093506E-01	-5.783215E-02	-2.202664E-03	6.372838E-01	2.807696E-03
5.419999E-01	1.342644E-01	1.342644E-01	-5.783215E-02	-2.276079E-03	9.582100E-01	2.90317E-03
5.470863E-01	1.608748E-01	1.608748E-01	-5.551426E-02	-2.369219E-03	4.983107E-01	2.951263E-03
5.575999E-01	1.815138E-01	1.815138E-01	-4.528210E-02	-2.894452E-03	1.094121E-02	3.110506E-03
5.633363E-01	1.954202E-01	1.954202E-01	-1.057774E-02	-2.588595E-03	4.988759E-01	3.160994E-03
5.638864E-01	1.863748E-01	1.967537E-01	-1.002033E-02	-2.597865E-03	7.045183E-00	3.167539E-03
5.652864E-01	1.863748E-01	2.001876E-01	-8.727417E-01	-2.621536E-03	1.772144E-01	3.185311E-03
5.688863E-01	2.028866E-01	2.028866E-01	-7.919727E-01	-2.635023E-03	3.1023519E-01	3.195546E-03
5.688864E-01	2.08748E-01	2.08748E-01	-5.236841E-01	-2.682020E-03	3.567197E-01	3.231218E-03
5.711464E-01	2.139299E-01	2.139299E-01	-3.180127E-01	-2.719703E-03	2.883456E-01	3.260052E-03

READING = 0036 BLOCK = 100 TIME = 132.684 MACH 6.0 PT = 748.999 TT = 2973.0

KAS8	P=IN	P=OUT	PDA	BOX	DAMALL	CAMALL
5.703864E 01	2.301247E 01	2.301247E 01	2.839466E 01	-2.839597E 03	9.262752E 01	3.352680E 03
5.805863E 01	2.369998E 01	2.369998E 01	8.249072E 01	-2.996606E 03	1.307153E 02	3.483395E 03
6.068664E 01	2.389998E 01	2.389998E 01	8.804541E 01	-3.279099E 03	2.578855E 02	3.741280E 03
6.228864E 01	2.167499E 01	2.167499E 01	8.804541E 01	-3.471875E 03	1.821893E 02	3.923469E 03
6.475264E 01	1.795497E 01	1.795497E 01	8.804541E 01	-3.830989E 03	3.161379E 02	4.239605E 03
6.512863E 01	1.897498E 01	1.738733E 01	8.804541E 01	-3.889671E 03	4.824660E 01	4.287844E 03
6.516864E 01	1.897498E 01	1.732692E 01	8.804541E 01	-3.895825E 03	5.134232E 00	4.292477E 03
6.536864E 01	1.805078E 01	1.702498E 01	8.804541E 01	-3.925671E 03	2.563889E 01	4.318633E 03
6.702864E 01	1.039392E 01	7.109999E 00	2.315535E 02	-4.115988E 03	2.159020E 02	4.534531E 03
6.769864E 01	7.283203E 00	7.207500E 00	3.935342E 02	-4.167074E 03	8.17694E 01	4.616285E 03
6.848663E 01	3.724998E 00	5.676544E 00	5.880423E 02	-4.215703E 03	9.480736E 01	4.711090E 03
6.918663E 01	3.018539E 00	4.244999E 00	6.641477E 02	-4.254793E 03	8.790805E 01	4.798996E 03
6.979863E 01	2.419998E 00	1.838623E 00	7.268533E 02	-4.253350E 03	7.402168E 01	4.873016E 03
7.074863E 01	2.30861E 00	1.049999E 00	7.407350E 02	-4.291770E 03	2.417022E 01	4.897191E 03
7.117863E 01	1.639999E 00	2.829999E 00	7.917837E 02	-4.319723E 03	9.022338E 01	4.987414E 03
7.270863E 01	1.107224E 00	2.664019E 00	8.228430E 02	-4.332809E 03	5.202614E 01	5.039438E 03
7.285863E 01	1.054999E 00	1.799999E 00	9.059348E 02	-4.361391E 03	1.842812E 02	5.223715E 03
7.360863E 01	1.098466E 00	1.61337E 00	9.118182E 02	-4.363042E 03	1.72417E 01	5.240953E 03
7.361263E 01	1.098466E 00	6.799999E 00	9.498690E 02	-4.373462E 03	8.453413E 01	5.325484E 03
7.493863E 01	1.026862E 00	4.750183E 01	9.511443E 02	-4.373531E 03	1.62043E 01	5.325645E 03
7.778664E 01	1.169998E 00	0.000000	9.75136E 02	-4.37230E 03	5.187865E 01	5.377320E 03
8.148663E 01	1.250000E 00	0.000000	1.023523E 03	-4.36367E 03	9.820615E 01	5.47573E 03
8.449863E 01	1.138998E 00	0.000000	1.074998E 03	-4.364410E 03	1.049444E 02	5.580084E 03
8.735863E 01	1.544998E 00	0.000000	1.096323E 03	-4.188563E 03	5.45251E 01	5.635254E 03
9.736864E 01	1.544998E 00	0.000000	1.124978E 03	-3.885562E 03	2.268561E 01	5.657938E 03
			1.124988E 03	-3.885088E 03	0.000000	5.657938E 03

READING = 0036 BLOCK = 100 TIME = 132.084 MACH 6.0 PT = 748.999 TT = 2973.8

X	DDRG	CDRAG	CF	HC
4.039999E 01	1.269156E 02	1.269156E 02	2.312058E-03	4.657498E-02
4.040999E 01	1.936217E-01	1.271092E 02	2.604733E-03	3.247317E-02
4.137363E 01	2.003616E 01	1.474608E 02	2.748146E-03	3.662872E-02
4.13362E 01	2.006622E-01	1.476614E 02	2.507573E-03	3.913934E-02
4.14868E 01	1.251766E 00	1.489132E 02	2.473130E-03	3.978852E-02
4.15000E 01	9.784696E-01	1.494916E 02	2.471125E-03	4.011463E-02
4.245999E 01	1.614700E 01	1.680381E 02	2.533665E-03	4.250965E-02
4.416864E 01	3.151250E 00	1.995511E 02	2.591751E-03	4.136964E-02
4.439999E 01	2.603192E 00	2.021543E 02	2.66354E-03	3.992469E-02
4.479999E 01	9.090166E 00	2.112445E 02	2.621511E-03	3.996164E-02
4.488362E 01	1.521233E 00	2.127658E 02	2.608909E-03	4.011513E-02
4.625000E 01	2.535532E 01	2.381211E 02	2.85828E-03	3.800002E-02
4.625999E 01	1.699500E-01	2.383111E 02	2.85828E-03	3.800002E-02
4.731000E 01	1.820314E 01	2.565142E 02	2.601036E-03	4.081968E-02
4.74063E 01	1.542162E 00	2.58056E 02	2.592490E-03	4.082450E-02
4.810999E 01	1.665237E 01	2.687083E 02	2.507200E-03	3.918346E-02
4.884863E 01	1.160862E 01	2.803169E 02	3.180032E-03	3.274624E-02
4.885863E 01	1.654334E-01	2.804822E 02	3.180032E-03	3.274624E-02
4.938664E 01	7.675102E 00	2.881572E 02	2.553257E-03	3.844162E-02
5.07963E 01	1.689139E 01	3.050484E 02	2.474857E-03	2.184406E-02
5.209664E 01	2.153751E 01	3.265859E 02	2.397157E-03	2.20979E-02
5.339664E 01	4.467403E 00	3.310532E 02	2.379504E-03	1.945993E-02
5.414864E 01	6.517131E 00	3.375688E 02	2.675610E-03	2.682470E-02
5.451999E 01	2.980209E 00	3.405491E 02	2.582732E-03	3.123944E-02
5.490863E 01	2.913403E 00	3.434624E 02	2.758337E-03	3.227477E-02
5.575999E 01	4.113099E 00	3.495654E 02	2.874928E-03	3.214927E-02
5.633363E 01	2.387332E 00	3.519526E 02	2.913410E-03	3.019189E-02
5.638664E 01	3.098573E-01	3.522625E 02	3.200186E-03	2.678729E-02
5.652864E 01	8.174708E-01	3.531079E 02	3.199457E-03	2.678795E-02
5.660863E 01	4.709956E-01	3.535508E 02	3.275558E-03	2.650302E-02
5.688664E 01	1.619919E 00	3.551707E 02	3.217424E-03	2.734767E-02
5.711464E 01	1.277019E 00	3.564475E 02	3.233977E-03	2.734425E-02
5.783664E 01	3.953212E 00	3.604006E 02	3.251667E-03	2.748350E-02
5.885863E 01	5.354604E 00	3.657551E 02	3.27317E-03	2.739080E-02
6.086864E 01	1.074959E 01	3.764980E 02	3.279075E-03	2.773262E-02
6.228664E 01	6.20841E 00	3.847063E 02	3.226921E-03	2.786655E-02
6.475864E 01	1.510600E 01	3.948127E 02	3.208485E-03	2.556275E-02
6.512863E 01	2.188728E 00	4.020015E 02	3.226403E-03	2.493114E-02
6.516864E 01	2.211592E-01	4.022224E 02	3.302684E-03	2.524313E-02
6.536864E 01	1.127882E 00	4.033501E 02	3.295027E-03	2.503918E-02
6.702864E 01	6.642998E 00	4.129929E 02	3.154037E-03	1.830560E-02
6.769864E 01	3.58454E 00	4.165774E 02	3.124160E-03	1.635334E-02
6.846863E 01	3.741506E 00	4.203180E 02	3.094169E-03	1.240791E-02
6.918863E 01	3.00664E 00	4.233254E 02	3.014397E-03	1.040027E-02
6.979863E 01	2.084259E 00	4.254097E 02	2.933641E-03	7.006983E-03
6.999863E 01	5.482519E-01	4.259578E 02	2.897703E-03	5.951636E-03
7.074863E 01	2.109407E 00	4.280671E 02	2.950040E-03	7.639740E-03
7.117863E 01	1.297488E 00	4.293645E 02	2.934797E-03	7.075887E-03
7.270863E 01	4.011049E 00	4.333755E 02	2.872971E-03	5.329665E-03
7.285863E 01	3.253401E-01	4.337007E 02	2.858154E-03	4.993837E-03
7.360863E 01	1.375131E 00	4.350757E 02	2.790679E-03	3.652497E-03
7.361283E 01	2.299220E-03	4.350779E 02	2.790230E-03	3.644900E-03
7.493863E 01	8.051553E-01	4.358829E 02	2.827307E-03	4.501235E-03
7.778864E 01	1.68788E 00	4.517570E 02	2.823416E-03	4.708562E-03
8.168863E 01	1.776880E 00	4.5393474E 02	2.789677E-03	4.343875E-03
8.449863E 01	8.697020E-01	4.401570E 02	2.727357E-03	3.396492E-03

READING = 0036 BLOCK = 100 TIME = 132.084 MACH 6.0 PT = 748.999 TT = 2973.8  
 X DDAG CDRAG CF HC  
 8.73583E 01 3.726983E-01 4.405295E 02 2.812496E-03 5.437590E-03  
 8.73646E 01 0.000000 4.405295E 02 2.813109E-03 5.441483E-03

ORIGINAL PAGE IS  
 OF POOR QUALITY

READING = 0036 BLOCK = 100 TIME = 132.688 MACH 6.0 PT = 740.999 TT = 2973.4

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# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 603. (LBF)  
 MEASURED THRUST..... 1139. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1324. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2500. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.2418  
 MEASURED THRUST COEFFICIENT..... 0.4506

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 5744. (LBF)  
 NET THRUST..... 747. (LBF)  
 SPECIFIC IMPULSE..... 1640. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.2996

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREE)  
 MASS FLOW RATIO..... 0.9813  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1579  
 DELTA P12..... 0.1233 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3229  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1603  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8856  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9045  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9205  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8793  
 ENTHALPY AT PU = SUPERSONIC..... 0.06 (BTU/LBM)  
 ENTHALPY AT PU = SUBSONIC..... 28.59 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0170  
 EQUIVALENCE RATIO..... 0.510  
 COMBUSTOR EFFICIENCY..... 0.839  
 TOTAL PRESSURE RATIO..... 0.1484  
 COMBUSTOR EFFECTIVENESS..... 0.7569  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9429  
 NOZZLE COEFFICIENT = C1..... 0.8690  
 PROCESS EFFICIENCY..... 0.8215  
 KINETIC ENERGY EFFICIENCY..... 0.8692

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 126.9 (LBF)  
 INLET MOMENTUM CHANGE..... -642.7 (LBF)  
 COMBUSTOR FRICTION DRAG..... 275.1 (LBF)  
 COMBUSTOR STRUT DRAG..... 81.07 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 448. (LBF)  
 NOZZLE FRICTION DRAG..... 38.53 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 998. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1037. (LBF)  
 EXTERNAL FRICTION DRAG..... 67.90 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -952. (LBF)  
 TOTAL EXTERNAL DRAG..... -1023. (LBF)  
 TOTAL STRUT DRAG..... 81.07 (LBF)  
 CAVITY FORCE..... -1230. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1679. (LBF)  
 MEASURED LOAD CELL FORCE..... -1143. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## STATIONS

NOMINAL CONE LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3886 (IN)  
 INLET THROAT..... 40.400 (IN)  
 CONE LEADING EDGE..... 35.273 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.013 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.165 (IN)  
 STRUT LEADING EDGE..... 56.529 (IN)  
 STRUT TRAILING EDGE..... 65.129 (IN)  
 COMBUSTOR EXIT..... 65.129 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.374	B
1C	44.300	D
2A	48.849	E
2C	46.250	
3A	54.139	
3B	50.324	
4	44.874	

ORIGINAL PAGE IS  
 OF POOR QUALITY

Reading 36

$t = 144.38 \text{ sec.}$



READING = 0036 BLOCK = 113 TIME = 149.384 MACH 6.0 PT = 747.999 TT = 2983.2  
RAMJET PERFORMANCE

## SUMMARY REPORT

	P	T	H	S	MACH	VEL	W/A	W	A/CAC	MOMTH	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5											
0.000	747.999	2983	664.3	1.2932	28.972	2573								
0.000	0.388	404	32.0	1.3989	28.971	984	5.996	5903	1.825	0.10626	26.727	0.9820	5001	9.747 187.1
SPIKE TIP NS	2	0	4											
0.600	18.112	2983	664.3	1.2931	28.971	2573								
0.600	16.381	2916	644.0	1.2952	28.971	2546	0.396	1009	2.081	0.10626	26.727	0.9820	4958	1.666 185.5
WIND TUNNEL	3	0	0											
0.000	747.999	2983	664.3	1.2932	28.972	2573								
0.000	0.382	402	32.4	1.3988	28.971	982	6.011	5904	1.825	0.10515	26.447	0.9820	4950	9.648 187.1
SPIKE TIP NS	4	0	0											
0.600	18.112	2983	664.3	1.2931	28.971	2573								
0.600	16.422	2917	644.5	1.2952	28.971	2546	0.391	996	2.081	0.10515	26.447	0.9820	4950	1.628 187.1
INLET THROAT	5	0	4											
0.400	259.233	2865	628.7	1.2969	28.972	2525								
0.400	18.645	1465	332.9	1.3498	28.971	1842	2.415	4450	1.086	0.94773	26.727	0.1101	4166	65.542 155.9
INLET UPNRSK	6	0	3											
0.400	259.233	2865	628.7	1.2969	28.972	2525								
0.400	14.267	1408	217.7	1.3531	28.971	1808	2.508	4535	1.086	0.86157	26.727	0.1211	4210	60.717 157.5
INLET DNRSK	7	0	4											
0.400	120.187	2865	628.7	1.2969	28.972	2525								
0.400	102.555	2762	598.0	1.3002	28.972	2403	0.499	1238	1.939	0.86157	26.727	0.1211	4210	16.533 157.5
COMBUSTOR	8	1	21											
0.410	209.525	2831	631.1	1.2992	27.742	2567								
0.410	11.218	1375	205.1	1.3562	27.742	1828	2.525	4617	1.968	0.95090	26.819	0.1101	4165	68.228 155.1 0.10 0.07
COMBUSTOR	9	0	2											
0.1354	161.102	2756	631.7	1.3033	26.546	2594								
0.1354	12.909	1479	241.8	1.3519	26.545	1935	2.283	4417	2.048	0.95502	26.915	0.1100	4059	65.551 150.8 0.21 0.04
COMBUSTOR	10	3	21											
0.1364	169.820	2713	631.6	1.3052	26.501	2578								
0.1364	12.927	1433	242.1	1.3548	26.500	1908	2.314	4415	2.040	0.95482	26.915	0.1101	4058	65.509 150.8 0.21 0.01
COMBUSTOR	11	4	21											
0.1429	169.808	2706	631.2	1.3056	26.494	2575								
0.1429	13.044	1431	243.8	1.3549	26.494	1908	2.308	4403	2.039	0.95570	26.915	0.1100	4051	65.398 150.5 0.21 0.00
COMBUSTOR	12	5	21											
0.1500	168.527	2703	630.8	1.3057	26.493	2574								
0.1500	13.218	1438	245.9	1.3546	26.493	1912	2.295	4389	2.039	0.95594	26.915	0.1099	4043	65.197 150.2 0.21 0.00
COMBUSTOR	13	6	21											
0.2460	153.060	2683	624.4	1.3064	26.493	2565								
0.2460	15.892	1534	273.6	1.3494	26.492	1971	2.126	4109	2.044	0.94652	26.915	0.1110	3957	61.625 147.0 0.21 0.00
COMBUSTOR	14	7	21											
0.2419	122.439	2736	611.0	1.3033	26.592	2582								
0.2419	16.322	1673	284.4	1.3416	26.592	2049	1.973	4043	2.065	0.91112	26.915	0.1153	3864	57.241 143.6 0.21 0.08
COMBUSTOR	15	8	21											
0.44310	132.149	2651	609.6	1.3072	26.508	2549								
0.44310	16.768	1594	286.8	1.3462	26.507	2006	2.003	4019	2.051	0.91055	26.915	0.1154	3858	56.871 143.3 0.21 0.01
COMBUSTOR	16	9	21											
0.4800	134.604	2624	605.0	1.3082	26.495	2538								
0.4800	18.122	1601	292.5	1.3460	26.495	2011	1.967	3954	2.047	0.90719	26.915	0.1158	3846	55.752 142.9 0.21 0.00
COMBUSTOR	17	10	21											
0.4864	135.436	2621	604.3	1.3084	26.493	2537								
0.4864	18.612	1607	294.8	1.3457	26.493	2014	1.954	3936	2.046	0.90681	26.915	0.1159	3845	55.467 142.9 0.21 0.00
COMBUSTOR	18	11	5											
0.48250	112.834	2646	600.2	1.3082	26.763	2636								
0.48250	22.272	1906	355.6	1.3341	26.763	2259	1.549	3498	2.180	0.86115	27.086	0.1228	3866	46.818 142.7 0.40 0.08

READING = 0036 BLOCK = 113 TIME = 144.384 MACH 6.0 PT = 747.999 TT = 2983.2

	P	1	H	GAMMA	MOLWT	SONV	MACH	VEL	8	M/A	M	A/AC	MOMTH	G	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.200	112.625	2649	600.1	1.3081	24.747	2037											
46.260	29.338	1910	355.9	1.3339	24.767	2262	1.546	3495	2.180	0.86071	27.086	0.1229	3866	46.754	142.7	0.40	0.08
COMBUSTOR	0	20	13	5													
47.310	95.988	2999	588.2	1.2915	25.149	2767											
47.310	37.422	2411	387.5	1.3113	25.150	2500	1.268	3169	2.223	0.80057	27.086	0.1321	3934	39.424	145.2	0.40	0.27
COMBUSTOR	0	21	14	3													
47.369	95.401	3017	507.3	1.2906	25.170	2773											
47.369	37.577	2432	387.5	1.3103	25.171	2509	1.260	3162	2.225	0.79566	27.086	0.1329	3981	39.097	145.5	0.40	0.28
COMBUSTOR	0	22	15	4													
48.110	92.199	3113	579.6	1.2857	25.293	2805											
48.110	34.481	2886	383.9	1.3070	25.294	2527	1.300	3285	2.234	0.74962	27.086	0.1418	4018	38.861	148.3	0.40	0.34
COMBUSTOR	0	23	16	5													
48.829	86.567	2979	583.0	1.2935	23.298	2868											
48.829	32.000	2362	331.1	1.3145	23.299	2574	1.306	3362	2.369	0.68656	27.292	0.1552	4124	35.868	151.1	0.63	0.22
COMBUSTOR	0	24	17	2													
48.839	86.483	2981	582.9	1.2934	23.300	2868											
48.839	31.934	2364	336.8	1.3148	23.301	2575	1.307	3364	2.370	0.68567	27.292	0.1554	4125	35.843	151.1	0.63	0.23
COMBUSTOR	0	25	18	4													
49.369	83.265	3078	578.1	1.2887	23.804	2903											
49.369	29.528	2423	336.9	1.3110	23.805	2597	1.337	3474	2.380	0.64127	27.292	0.1662	4203	34.618	154.0	0.63	0.26
COMBUSTOR	0	26	19	4													
50.779	78.273	3214	566.4	1.2817	23.565	2948											
50.779	22.675	2422	273.5	1.3089	23.567	2566	1.480	3828	2.395	0.54653	27.292	0.1950	4360	32.515	160.5	0.63	0.32
COMBUSTOR	0	27	20	4													
52.879	69.679	3457	551.5	1.2687	23.847	3024											
52.879	18.187	2567	216.2	1.3003	23.852	2637	1.553	4096	2.420	0.48795	27.292	0.2379	4582	28.512	167.9	0.63	0.42
COMBUSTOR	0	28	21	4													
53.379	66.099	3580	548.2	1.2619	23.982	3060											
53.379	19.833	2712	216.8	1.2934	23.991	2496	1.510	4072	2.432	0.42964	27.292	0.2480	4625	27.100	169.5	0.63	0.47
COMBUSTOR	0	29	22	4													
54.129	64.168	3633	543.5	1.2582	24.060	3078											
54.129	17.882	2738	196.4	1.2915	24.071	2703	1.542	4168	2.437	0.40500	27.292	0.2631	4686	26.230	171.7	0.63	0.49
COMBUSTOR	0	30	23	3													
54.520	63.388	3667	541.1	1.2567	24.091	3084											
54.520	16.377	2741	193.2	1.2910	24.103	2701	1.562	4220	2.439	0.39332	27.292	0.2709	4716	25.794	172.8	0.63	0.50
COMBUSTOR	0	31	24	3													
54.889	62.788	3684	538.9	1.2556	24.115	3088											
54.889	15.712	2736	174.4	1.2909	24.128	2698	1.583	4271	2.441	0.38298	27.292	0.2782	4743	25.420	173.8	0.63	0.51
COMBUSTOR	0	32	25	3													
55.760	61.787	3768	538.0	1.2540	24.154	3094											
55.760	14.227	2707	188.8	1.2914	24.168	2682	1.637	4390	2.443	0.36086	27.292	0.2953	4800	24.619	175.9	0.63	0.53
COMBUSTOR	0	33	26	5													
56.314	48.283	4106	531.2	1.2271	24.597	3191											
56.314	13.284	3193	152.7	1.2677	24.644	2853	1.525	4351	2.482	0.28959	27.292	0.3679	4943	19.584	181.1	0.63	0.68
COMBUSTOR	0	34	27	5													
56.319	55.880	3754	530.9	1.2508	24.212	3105											
56.319	10.251	2609	91.5	1.2940	24.229	2632	1.781	4689	2.453	0.28883	27.292	0.3689	4946	21.040	181.2	0.63	0.55
COMBUSTOR	0	35	28	3													
56.509	55.781	3758	530.3	1.2506	24.217	3106											
56.509	10.132	2606	88.2	1.2941	24.234	2631	1.788	4703	2.453	0.28670	27.292	0.3717	4954	20.954	181.5	0.63	0.55
COMBUSTOR	0	36	29	6													
56.589	49.439	4075	529.9	1.2294	24.565	3184											
56.589	12.815	3113	139.9	1.2709	24.609	2827	1.565	4423	2.478	0.28996	27.292	0.3675	4958	19.932	181.7	0.63	0.67
COMBUSTOR	0	37	30	3													
56.809	50.382	4045	528.6	1.2316	24.535	3177											
56.809	12.337	3047	126.2	1.2739	24.576	2802	1.601	4487	2.475	0.28895	27.292	0.3688	4972	20.151	182.2	0.63	0.66

READING = 0036 BLOCK = 113 TIME = 141.384 MACH 6.0 PT = 747.999 TT = 2083.2																	
	P	I	M	GAMMA	MULTI	SONV	MACH	VEL	S	W/A	M	A/AC	MOTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31														
57.095	50.922	4036	527.6	1.2322	24.528	3175											
57.095	12.129	3021	119.3	1.2750	24.568	2792	1.619	4520	2.474	0.28851	27.292	0.3693	0981	20.266	182.5	0.63	0.66
COMBUSTOR	0	39	32														
57.819	51.760	4012	524.5	1.2338	24.510	3169											
57.819	11.462	2952	101.0	1.2778	24.547	2764	1.665	4603	2.471	0.28393	27.292	0.3753	5006	20.311	183.4	0.63	0.65
COMBUSTOR	0	40	33														
58.839	96.459	3174	520.7	1.2822	23.644	2925											
58.839	5.662	1618	33.6	1.3402	23.646	2135	2.407	5268	2.369	0.28213	27.292	0.3777	5016	23.095	183.8	0.63	0.35
COMBUSTOR	0	41	34														
60.849	46.384	4424	513.6	1.2025	25.013	3252											
60.849	15.825	3656	169.4	1.2402	25.115	2996	1.385	4150	2.493	0.29195	27.292	0.3650	5000	18.029	183.2	0.63	0.84
COMBUSTOR	0	42	35														
62.269	47.730	4385	507.9	1.2057	24.983	3244											
62.269	15.975	3601	161.2	1.2437	25.076	2980	1.398	4165	2.489	0.29986	27.292	0.3553	0987	19.409	182.7	0.63	0.82
COMBUSTOR	0	43	36														
64.733	43.672	4476	495.6	1.1971	25.127	3256											
64.733	16.635	3794	180.8	1.2311	25.239	3033	1.309	3969	2.497	0.28423	27.292	0.3749	0964	17.530	181.9	0.63	0.88
COMBUSTOR	0	44	37														
65.109	39.172	4660	493.3	1.1807	25.354	3285											
65.109	18.493	4154	234.8	1.2050	25.504	3124	1.151	3596	2.508	0.26424	27.292	0.4032	0960	14.767	181.8	0.63	0.98
COMBUSTOR	0	45	38														
65.109	39.172	4852	617.0	1.1692	25.229	3344											
65.109	22.109	4483	407.4	1.1858	25.393	3223	1.005	3239	2.534	0.26424	27.292	0.4032	5031	13.500	184.3	0.63	0.98
NOZZLE	AE	46	39														
87.345	39.172	4660	493.3	1.1807	25.354	3285											
87.345	1.146	2389	463.7	1.2862	25.604	2943	2.833	4920	2.508	0.05501	27.292	1.9371	6439	5.916	235.9	0.63	0.98
NOZZLE	PO	47	40														
87.345	39.172	4660	493.3	1.1807	25.354	3285											
87.345	0.388	1864	641.9	1.3078	25.604	2176	3.464	7537	2.508	0.02597	27.292	4.1031	6801	3.042	244.2	0.63	0.98
NOZZLE	AE	48	41														
87.345	39.172	4852	617.0	1.1692	25.229	3344											
87.345	1.222	2608	386.3	1.2780	25.604	2544	2.785	7086	2.534	0.05501	27.292	1.9371	6617	6.057	242.4	0.63	0.98
NOZZLE	PO	49	42														
87.345	39.172	4852	617.0	1.1692	25.229	3344											
87.345	0.388	2015	591.5	1.3010	25.604	2256	3.446	7776	2.534	0.02478	27.292	4.3000	7023	2.995	297.3	0.63	0.98
FICTIVE	COMBUSTOR	70	63														
65.109	259.233	4802	493.3	1.1968	25.519	3346											
65.109	0.388	1190	879.4	1.3457	25.681	1761	4.707	8288	2.500	0.00487	27.292	2.3748	7266	5.779	266.2	0.63	1.00
FICTIVE	NOZZLE	71	64														
87.345	22.226	4635	500.5	1.1735	25.305	3269											
87.345	1.535	2894	282.7	1.2667	25.601	2668	2.346	6260	2.554	0.05501	27.292	1.9371	6072	5.352	222.5	0.63	0.98

READING = 0036 BLOCK = 115 TIME = 144.384 MACH 6.0 PT = 747.999 TT = 2983.2

XAB8	P=IN	P=OUT	PDA	GOX	DAWALL	CAMALL
6.981400E-01	2.244999E 00	0.000000	-4.413142E-01	0.000000	2.470292E-02	2.470292E-02
3.070000E 01	2.244999E 00	0.000000	-2.562037E 02	0.000000	4.563358E 02	4.563358E 02
3.507999E 01	4.000499E 00	0.000000	-4.587471E 02	0.000000	1.751353E 02	6.311188E 02
3.524607E 01	4.026277E 00	5.735992E 00	-5.292698E 02	0.000000	7.358204E 00	6.388770E 02
3.525249E 01	4.027044E 00	5.718601E 00	-5.293281E 02	0.000000	2.666680E 01	6.391436E 02
3.554999E 01	4.064999E 00	4.862183E 00	-5.343358E 02	0.000000	2.981285E 01	6.689563E 02
3.591609E 01	4.054153E 00	3.799998E 00	-5.463362E 02	-6.379414E 02	3.747944E 01	7.064358E 02
3.606000E 01	4.048999E 00	4.351624E 00	-5.517017E 02	-6.430923E 02	1.445823E 01	7.208938E 02
3.648000E 01	4.256870E 00	5.991089E 00	-5.651521E 02	-6.587915E 02	4.357929E 01	7.684729E 02
3.700999E 01	4.169998E 00	8.059937E 00	-5.823786E 02	-6.944771E 02	5.589644E 01	8.203691E 02
3.705899E 01	4.192204E 00	8.289997E 00	-5.840433E 02	-6.972415E 02	5.561654E 00	8.257307E 02
3.737899E 01	4.338076E 00	7.787497E 00	-5.948052E 02	-7.15278E 02	3.432141E 01	8.600520E 02
3.790899E 01	4.579700E 00	1.220000E 01	-6.131201E 02	-7.465479E 02	5.778183E 01	9.178337E 02
3.803000E 01	4.634998E 00	1.197099E 01	-6.151038E 02	-7.538357E 02	1.340448E 01	9.312380E 02
3.839870E 01	6.339608E 00	1.127498E 01	-6.240879E 02	-7.772139E 02	4.114450E 01	9.723823E 02
3.875000E 01	7.768494E 00	1.398462E 01	-6.333118E 02	-8.018262E 02	3.980093E 01	1.012183E 03
3.886870E 01	8.285080E 00	1.489999E 01	-6.347104E 02	-8.106881E 02	1.349494E 01	1.025678E 03
3.900999E 01	8.899999E 00	1.518051E 01	-6.351663E 02	-8.216042E 02	1.601074E 01	1.041689E 03
3.937869E 01	1.527686E 01	1.591248E 01	-6.445906E 02	-8.521082E 02	4.256563E 01	1.084254E 03
3.950000E 01	1.717498E 01	1.499316E 01	-6.503327E 02	-8.627998E 02	1.406889E 01	1.098323E 03
3.986870E 01	1.804323E 01	1.220000E 01	-6.688760E 02	-8.974119E 02	4.289070E 01	1.141230E 03
4.000000E 01	1.928122E 01	9.856201E 00	-6.770159E 02	-9.105405E 02	1.535694E 01	1.156587E 03
4.036870E 01	1.901401E 01	3.274996E 00	-7.078176E 02	-9.489751E 02	4.321707E 01	1.199804E 03
4.039999E 01	1.807622E 01	3.324936E 00	-7.112682E 02	-9.748975E 02	3.666421E 00	1.203470E 03
4.040999E 01	1.909607E 01	3.350881E 01	-7.129348E 02	-9.753443E 02	1.180970E 00	1.240651E 03
4.135368E 01	2.097168E 01	4.804558E 00	-7.989099E 02	-1.076898E 03	1.116219E 02	1.316273E 03
4.136368E 01	2.099152E 01	4.862503E 00	-7.997170E 02	-1.078834E 03	1.170691E 00	1.317444E 03
4.142870E 01	2.112076E 01	4.966248E 00	-8.051451E 02	-1.088339E 03	7.738317E 00	1.325182E 03
4.150000E 01	2.126248E 01	5.173981E 00	-8.112676E 02	-1.099847E 03	8.478820E 00	1.333661E 03
4.245999E 01	2.381248E 01	7.970795E 00	-8.400136E 02	-1.272948E 03	1.148532E 02	1.488514E 03
4.41870E 01	1.975310E 01	1.289061E 01	-9.426975E 02	-1.634133E 03	2.044006E 02	1.652914E 03
4.430998E 01	1.936539E 01	1.416992E 01	-9.460622E 02	-1.671567E 03	1.957112E 01	1.872485E 03
4.479999E 01	1.861874E 01	1.805640E 01	-9.494753E 02	-1.795124E 03	5.978971E 01	1.732274E 03
4.486368E 01	1.866187E 01	1.856152E 01	-9.490989E 02	-1.812344E 03	7.779073E 00	1.740053E 03
4.625000E 01	2.898642E 01	2.955664E 01	-9.04290E 02	-2.213149E 03	1.703324E 02	1.910385E 03
4.625999E 01	2.906128E 01	2.903574E 01	-9.047931E 02	-2.216222E 03	1.242974E 00	1.911628E 03
4.731000E 01	3.688123E 01	3.796362E 01	-8.219037E 02	-2.537324E 03	1.301738E 02	2.001802E 03
4.738899E 01	3.656584E 01	3.858748E 01	-8.133066E 02	-2.560895E 03	9.703526E 00	2.051505E 03
4.810999E 01	3.367499E 01	3.528763E 01	-7.268350E 02	-2.771370E 03	8.995033E 01	2.141455E 03
4.882899E 01	3.199963E 01	3.199963E 01	-6.111719E 02	-2.965488E 03	8.992010E 01	2.231375E 03
4.883888E 01	3.195390E 01	3.195390E 01	-6.095012E 02	-2.968072E 03	1.252718E 00	2.232628E 03
4.936870E 01	2.952914E 01	2.952914E 01	-5.243720E 02	-3.100018E 03	2.209110E 03	2.209110E 03
5.077869E 01	2.267499E 01	2.267499E 01	-3.315979E 02	-3.419900E 03	1.775520E 02	2.476662E 03
5.287869E 01	1.818748E 01	1.818748E 01	-1.066401E 02	-3.827471E 03	2.662979E 02	2.742460E 03
5.337869E 01	1.843330E 01	1.843330E 01	-5.907028E 01	-3.915211E 03	6.648273E 01	2.806688E 03
5.412869E 01	1.708189E 01	1.708189E 01	9.674805E 00	-4.043092E 03	9.582100E 01	2.902509E 03
5.451999E 01	1.637683E 01	1.637683E 01	4.317822E 01	-4.107099E 03	5.010091E 01	2.952410E 03
5.488899E 01	1.571249E 01	1.571249E 01	7.324219E 01	-4.167320E 03	4.8727620E 01	2.999886E 03
5.575999E 01	1.422733E 01	1.422733E 01	1.386434E 02	-4.303334E 03	1.111974E 02	3.111865E 03
5.631369E 01	1.328352E 01	1.328352E 01	2.848574E 02	-4.380137E 03	4.863208E 01	3.160497E 03
5.636870E 01	7.312409E 00	1.38976E 01	2.889189E 02	-4.387039E 03	7.045183E 00	3.167542E 03
5.650870E 01	7.312409E 00	1.295113E 01	2.971357E 02	-4.404508E 03	1.777214E 01	3.185314E 03
5.658888E 01	1.281479E 01	1.281479E 01	3.023096E 02	-4.414430E 03	1.023519E 01	3.195550E 03
5.686870E 01	1.233750E 01	1.233750E 01	3.187297E 02	-4.444828E 03	3.567197E 01	3.231221E 03
5.709470E 01	1.212935E 01	1.212935E 01	3.305310E 02	-4.476207E 03	2.683456E 01	3.260056E 03

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0036 BLOCK = 113 TIME = 144.384 MACH 6.0 PT = 747.999 TT = 2903.2

XABS	P-IN	P-OUT	PDA	QOX	DAWALL	CAWALL
5.781870E 01	1.146250E 01	1.146250E 01	3.626152E 02	-4.561805F 03	9.262752E 01	3.352683E 03
5.883868E 01	5.662493E 00	5.662493E 00	3.821451E 02	-4.665328E 03	1.307153E 02	3.481398E 03
6.084869E 01	1.582499E 01	1.582499E 01	3.849520E 02	-4.860117E 03	2.578855E 02	3.741284E 03
6.226869E 01	1.597499E 01	1.597499E 01	3.849520E 02	-5.015762E 03	1.821893E 02	3.923473E 03
6.473270E 01	1.663499E 01	1.663499E 01	3.849520E 02	-5.353070E 03	3.161379E 02	4.239609E 03
6.510869E 01	2.029998E 01	1.673370E 01	3.849520E 02	-5.413922E 03	4.824060E 01	4.287848E 03
6.514870E 01	2.029998E 01	1.674433E 01	3.849520E 02	-5.420410E 03	5.134232E 00	4.292480E 03
6.534869E 01	1.928857E 01	1.679999E 01	3.849520E 02	-5.452020E 03	2.565889E 01	4.318437E 03
6.700870E 01	1.131053E 01	9.379998E 00	5.401050E 02	-5.657988E 03	2.159020E 02	4.534535E 03
6.767870E 01	8.09576E 00	9.067498E 00	7.316520E 02	-5.715707E 03	8.175694E 01	4.616289E 03
6.844868E 01	9.389999E 00	6.88288E 00	9.260977E 02	-5.770863E 03	9.480736E 01	4.711094E 03
6.916869E 01	3.434494E 00	6.839999E 00	1.050369E 03	-5.814297E 03	8.790805E 01	4.799000E 03
6.977869E 01	2.629999E 00	2.012207E 00	1.120607E 03	-5.846098E 03	7.402168E 01	4.873020E 03
7.072068E 01	1.808801E 00	1.084999E 00	1.135510E 03	-5.855641E 03	2.417622E 01	4.897195E 03
7.115869E 01	1.439999E 00	2.590134E 00	1.187400E 03	-5.868398E 03	9.022328E 01	4.987418E 03
7.208869E 01	1.112336E 00	1.629999E 00	1.217399E 03	-5.903840E 03	9.202614E 01	5.039441E 03
7.283868E 01	1.084999E 00	1.466660E 00	1.295859E 03	-5.930668E 03	1.842812E 02	5.223719E 03
7.358868E 01	1.065167E 00	1.466660E 00	1.301508E 03	-5.931363E 03	1.724117E 01	5.240957E 03
7.359268E 01	1.065062E 00	6.499996E 01	1.337668E 03	-5.937426E 03	8.453413E 01	5.325488E 03
7.491869E 01	1.029999E 00	6.456299E 01	1.338936E 03	-5.937469E 03	1.620043E 01	5.325488E 03
7.776869E 01	1.649999E 00	0.000000	1.361065E 03	-5.934527E 03	9.187865E 01	5.377923E 03
8.168869E 01	1.519999E 00	0.000000	1.414651E 03	-5.892516E 03	9.820615E 01	5.475727E 03
8.447868E 01	8.999992E 01	0.000000	1.482399E 03	-5.796168E 03	1.049644E 02	5.580688E 03
8.733868E 01	1.579999E 00	0.000000	1.509292E 03	-5.649680E 03	3.457251E 01	5.635258E 03
8.734470E 01	1.581436E 00	0.000000	1.539204E 03	-5.216512E 03	2.268566E 01	5.657941E 03
			1.539214E 03	-5.215836E 03	0.000000	5.657941E 03

READING 0036 BLOCK 113 TIME 144.384 MACH 0.0 PT 747.999 TI 2983.2

X	DORAG	CORAG	CF	MC
4.03999E 01	1.269792E 02	1.269792E 02	2.260082E-03	4.485499E-02
4.04099E 01	1.899706E-01	1.271692E 02	2.549942E-03	3.244166E-02
4.13536E 01	1.958163E 01	1.407508E 02	2.695373E-03	3.569912E-02
4.13636E 01	1.973606E-01	1.469482E 02	2.449668E-03	3.607811E-02
4.142870E 01	1.233176E 00	1.481799E 02	2.413963E-03	3.866770E-02
4.15000E 01	1.336492E 00	1.495164E 02	2.413403E-03	3.904255E-02
4.24599E 01	1.778775E 01	1.673041E 02	2.470462E-03	4.347508E-02
4.414870E 01	3.025151E 01	1.975793E 02	2.513403E-03	4.300863E-02
4.43098E 01	2.850007E 00	2.004293E 02	2.591168E-03	4.279180E-02
4.47999E 01	6.600034E 00	2.050293E 02	2.506836E-03	4.669531E-02
4.48636E 01	1.086751E 00	2.101160E 02	2.506836E-03	5.684149E-02
4.62500E 01	2.336078E 01	2.334768E 02	2.856530E-03	6.081869E-02
4.62599E 01	1.604075E-01	2.336372E 02	2.660145E-03	6.750432E-02
4.73100E 01	1.496849E 01	2.484057E 02	2.677104E-03	6.270766E-02
4.73869E 01	1.058831E 00	2.496645E 02	2.881574E-03	5.998372E-02
4.81099E 01	9.934286E 00	2.595986E 02	2.843982E-03	5.363170E-02
4.86368E 01	9.680982E 00	2.694795E 02	3.101580E-03	5.818545E-02
4.936870E 01	1.341580E-01	2.696135E 02	2.872090E-03	5.572020E-02
5.07769E 01	6.677536E 00	2.762910E 02	2.827977E-03	4.717787E-02
5.26768E 01	2.233710E 01	3.153040E 02	2.731543E-03	3.973721E-02
5.33769E 01	4.963951E 00	3.202678E 02	2.862211E-03	3.788929E-02
5.41269E 01	7.158331E 00	3.216260E 02	2.766159E-03	3.532619E-02
5.45199E 01	3.774774E 00	3.314006E 02	2.904799E-03	3.598599E-02
5.48869E 01	3.514748E 00	3.349133E 02	2.901764E-03	3.294548E-02
5.57599E 01	8.190563E 00	3.430054E 02	2.873113E-03	3.079700E-02
5.63139E 01	3.069835E 00	3.460754E 02	2.834490E-03	2.768083E-02
5.634670E 01	4.173404E-01	3.464927E 02	2.993222E-03	2.244307E-02
5.650870E 01	1.083417E 00	3.475759E 02	2.811292E-03	2.349494E-02
5.65868E 01	6.237107E-01	3.482129E 02	3.277455E-03	2.355967E-02
5.666870E 01	2.234355E 00	3.504470E 02	2.973206E-03	2.522139E-02
5.709470E 01	1.728677E 00	3.521724E 02	2.949778E-03	2.510371E-02
5.781870E 01	5.517636E 00	3.576902E 02	2.922224E-03	2.430972E-02
5.86368E 01	8.239689E 00	3.659297E 02	2.886404E-03	1.527873E-02
6.08486E 01	1.472519E 01	3.804548E 02	2.561328E-03	3.327908E-02
6.22686E 01	9.866681E 00	3.905212E 02	3.103943E-03	2.772995E-02
6.473270E 01	1.817247E 01	4.086934E 02	3.120764E-03	2.759494E-02
6.51086E 01	2.476649E 00	4.111702E 02	3.237582E-03	2.721253E-02
6.514870E 01	2.508248E-01	4.114209E 02	3.378455E-03	2.716979E-02
6.53486E 01	1.285843E 00	4.127065E 02	3.373049E-03	2.697174E-02
6.700870E 01	1.091602E 01	4.236226E 02	3.275935E-03	2.094176E-02
6.767870E 01	4.058440E 00	4.276809E 02	3.247414E-03	1.879507E-02
6.84486E 01	4.278745E 00	4.319595E 02	3.183333E-03	1.440425E-02
6.91689E 01	3.432831E 00	4.353921E 02	3.140989E-03	1.167881E-02
6.97769E 01	2.331386E 00	4.377234E 02	3.059651E-03	7.705230E-03
6.99768E 01	5.996780E-01	4.383230E 02	3.022075E-03	6.297809E-03
7.07286E 01	2.241724E 00	4.405647E 02	3.059464E-03	7.731382E-03
7.11586E 01	1.339978E 00	4.419045E 02	3.039597E-03	6.929344E-03
7.26869E 01	4.073473E 00	4.459778E 02	2.982535E-03	5.183265E-03
7.28368E 01	3.300498E-01	4.463076E 02	2.971174E-03	4.894955E-03
7.35868E 01	1.401406E 00	4.477090E 02	2.909647E-03	3.596677E-03
7.35926E 01	2.345814E-03	4.477112E 02	2.902344E-03	3.589304E-03
7.49186E 01	7.972562E-01	4.485083E 02	2.927064E-03	4.136767E-03
7.77689E 01	1.863306E 00	4.503713E 02	2.982099E-03	5.903576E-03
8.16689E 01	2.216008E 00	4.529879E 02	2.951128E-03	5.509708E-03
8.44788E 01	9.582720E-01	4.533461E 02	2.862100E-03	3.660955E-03

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READING = 0036 BLOCK = 113 TIME = 141.384 MACH 6.0 PT = 747.949 TT = 2983.2

X	DRAG	CDRAG	CF	HC
8.73386E 01	4.019675E-01	4.939480E 02	2.930712E-03	5.621556E-03
8.734470E 01	0.000000	4.539480E 02	2.930415E-03	5.625375E-03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST.....	1068. (LBF)	ANGLE OF ATTACK .....	0.000 (DEGREES)
MEASURED THRUST.....	1382. (LBF)	MACH FLOW RATIO.....	0.9820
CALCULATED SPECIFIC IMPULSE.....	1688. (LBF-SEC/LBM)	ADDITIONAL DRAG COEFFICIENT.....	0.0007
MEASURED SPECIFIC IMPULSE.....	2045. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1583
CALCULATED THRUST COEFFICIENT.....	0.0276	DELTA PT2.....	0.1200 (PSI)
MEASURED THRUST COEFFICIENT.....	0.0537	TOTAL PRESSURE RECOVERY = SUPERSONIC.....	0.1466
		TOTAL PRESSURE RECOVERY = SUBSONIC.....	0.1607
		INLET PROCESS EFFICIENCY = SUPERSONIC.....	0.8952
		INLET PROCESS EFFICIENCY = SUBSONIC.....	0.9074
		KINETIC ENERGY EFFICIENCY = SUPERSONIC.....	0.9089
		KINETIC ENERGY EFFICIENCY = SUBSONIC.....	0.8650
		ENTHALPY AT PU = SUPERSONIC.....	24.22 (BTU/LBM)
		ENTHALPY AT PU = SUBSONIC.....	26.37 (BTU/LBM)

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

STREAM THRUST.....	6240. (LBF)
NET THRUST.....	1236. (LBF)
SPECIFIC IMPULSE.....	2186. (LBF-SEC/LBM)
THRUST COEFFICIENT.....	0.0949

MOMENTUM AND FORCES

COMBUSTOR

INLET FRICTION DRAG.....	127.0 (LBF)	FUEL-AIR RATIO.....	0.0212
INLET MOMENTUM CHANGE.....	839.2 (LBF)	EQUIVALENT RATIO.....	0.632
COMBUSTOR FRICTION DRAG.....	284.2 (LBF)	COMBUSTOR EFFICIENCY.....	0.977
COMBUSTOR STRUT DRAG.....	17.96 (LBF)	TOTAL PRESSURE RATIO.....	0.1511
COMBUSTOR MOMENTUM CHANGE.....	794. (LBF)	COMBUSTOR EFFECTIVENESS.....	0.8498
NOZZLE FRICTION DRAG.....	42.78 (LBF)	INJECTOR DISCHARGE COEFFICIENTS.....	
NOZZLE STRUT DRAG.....	0.00 (LBF)		
NOZZLE MOMENTUM CHANGE.....	1111. (LBF)		
NOZZLE PRESSURE INTEGRAL.....	1154. (LBF)		
EXTERNAL FRICTION DRAG.....	65.55 (LBF)		
EXTERNAL PRESSURE INTEGRAL.....	970. (LBF)		
TOTAL EXTERNAL DRAG.....	1035. (LBF)		
TOTAL STRUT DRAG.....	17.96 (LBF)		
CAVITY FORCE.....	1516. (LBF)		
CALCULATED LOAD CELL FORCE.....	1284. (LBF)		
MEASURED LOAD CELL FORCE.....	8969. (LBF)		
FUEL VACUUM SPECIFIC IMPULSE.....			

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8.....	0.9430
NOZZLE COEFFICIENT = C1.....	0.8646
PROCESS EFFICIENCY.....	0.8054
KINETIC ENERGY EFFICIENCY.....	0.8692

STATIONS

NOMINAL COWL LEADING EDGE.....	34.884 (IN)
SPIKE TRANSLATION.....	0.3687 (IN)
INLET THROAT.....	40.400 (IN)
COWL LEADING EDGE.....	35.253 (IN)
NOZZLE SHROUD TRAILING EDGE.....	73.593 (IN)
NOZZLE PLUG TRAILING EDGE.....	87.345 (IN)
STRUT LEADING EDGE.....	56.509 (IN)
STRUT TRAILING EDGE.....	65.109 (IN)
COMBUSTOR EXIT.....	65.109 (IN)

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.354	B
1C	44.300	
2A	46.629	D
2C	46.250	E
3A	54.119	
3B	50.304	
4	44.854	



Reading 36

$t = 158.78 \text{ sec.}$

READING = 0036 BLOCK = 129 TIME = 158.784 MACH 6.0 PT = 748.249 TT = 2984.0  
RANJET PERFORMANCE

SUMMARY REPORT

	P	T	M	S	MACH	VEL	S	W/A	M	A/AC	MOMTH	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5												
0.000	748.249	2984	664.5			1.2432	28.972	2573							
0.000	0.388	404	-32.0			1.3389	28.971	985	5.996	5903	1.825	0.10629	26.778	0.9836	5011 9.752 187.1
SPIKE TIP N8	2	0	5												
0.600	18.137	2984	664.5			1.2930	28.971	2573							
0.600	16.407	2917	644.2			1.2952	28.971	2546	0.386	1008	2.081	0.10629	26.778	0.9836	4972 1.665 185.7
WIND TUNNEL	3	0	0												
0.000	748.249	2984	664.5			1.2932	28.972	2573							
0.000	0.382	402	-32.3			1.3388	28.971	983	6.009	5905	1.825	0.10527	26.320	0.9836	4964 9.661 187.2
SPIKE TIP N8	4	0	0												
0.600	18.137	2984	664.5			1.2930	28.971	2573							
0.600	16.445	2918	684.7			1.2952	28.971	2547	0.391	996	2.081	0.10527	26.520	0.9836	4964 1.630 187.2
INLET THROAT	5	0	4												
40.400	247.443	2899	638.8			1.2950	28.972	2539							
40.400	17.264	1517	246.6			1.3469	28.971	1873	2.366	4430	1.893	0.94517	26.778	0.1106	4174 65.065 155.9
INLET UPNRSK	6	0	3												
40.400	247.443	2899	638.8			1.2950	28.972	2539							
40.400	14.784	1457	230.8			1.3502	28.971	1838	2.439	4518	1.893	0.85925	26.778	0.1217	4221 60.331 157.6
INLET DNRSK	7	0	4												
40.400	119.767	2899	638.8			1.2950	28.972	2539							
COMBUSTOR	8	0	1												
40.400	101.897	2793	607.2			1.2992	28.972	2495	0.503	1256	1.942	0.85925	26.778	0.1217	4221 16.775 157.6
COMBUSTOR	9	0	2												
40.410	199.863	2863	641.3			1.2980	27.786	2580							
40.410	11.135	1409	214.8			1.3542	27.786	1848	2.501	4622	1.973	0.94821	26.867	0.1106	4175 68.193 155.4 0.10 0.07
COMBUSTOR	10	0	2												
41.332	184.326	2786	643.4			1.3019	26.621	2607							
41.332	12.255	1500	247.6			1.3506	26.620	1945	2.288	4450	2.052	0.95325	26.960	0.1104	4276 65.925 151.2 0.20 0.09
COMBUSTOR	11	0	3												
41.342	162.300	2755	643.3			1.3038	26.577	2592							
41.342	12.268	1455	247.8			1.3535	26.577	1919	2.318	4449	2.044	0.95300	26.960	0.1105	4275 65.884 151.1 0.20 0.01
COMBUSTOR	12	0	4												
41.407	162.066	2748	643.0			1.3041	26.571	2588							
41.407	12.347	1453	249.4			1.3536	26.570	1919	2.313	4438	2.043	0.95244	26.960	0.1105	4268 65.691 150.9 0.20 0.00
COMBUSTOR	13	0	5												
41.500	160.741	2745	642.6			1.3042	26.570	2588							
41.500	12.557	1462	252.0			1.3532	26.569	1924	2.298	4421	2.043	0.95354	26.960	0.1104	4259 65.511 150.6 0.20 0.00
COMBUSTOR	14	0	6												
42.400	150.667	2728	637.2			1.3048	26.569	2581							
42.400	16.440	1583	287.1			1.3468	26.569	1997	2.096	4186	2.046	0.94409	26.960	0.1115	3977 61.411 147.5 0.20 0.00
COMBUSTOR	15	0	7												
44.127	129.895	2699	623.2			1.3055	26.584	2567							
44.127	24.595	1800	340.5			1.3368	26.584	2122	1.754	3721	2.054	0.91044	26.960	0.1156	3846 52.647 142.7 0.20 0.01
COMBUSTOR	16	0	8												
44.310	128.848	2681	621.3			1.3063	26.572	2560							
44.310	26.291	1821	356.4			1.3361	26.571	2134	1.706	3640	2.052	0.90924	26.960	0.1158	3830 51.436 142.1 0.20 0.00
COMBUSTOR	17	0	9												
44.800	116.326	2769	615.4			1.3019	26.684	2592							
44.800	30.826	2015	380.5			1.3276	26.684	2232	1.536	3429	2.048	0.90591	26.960	0.1162	3791 48.271 140.6 0.20 0.10
COMBUSTOR	18	0	10												
44.842	115.615	2774	614.9			1.3017	26.691	2594							
44.842	31.126	2026	381.9			1.3271	26.691	2238	1.525	3414	2.049	0.90571	26.960	0.1162	3787 48.054 140.5 0.20 0.10
COMBUSTOR	19	0	11												
46.250	97.249	2693	612.7			1.3069	24.143	2692							
46.250	41.245	2193	440.7			1.3240	24.143	2045	1.200	2934	2.243	0.86206	27.206	0.1232	3782 39.300 134.0 0.48 0.09



READING = 0036 BLOCK = 129 TIME = 158.784 MACH 6.0 PT = 748.249 TT = 2984.0

	P	1	H	GAMMA	MOLWT	SONV	MACH	VEL	8	W/A	M	A/AC	MOMTH	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4													
57.073	51.851	4306	526.2	1.2142	23.613	3318											
57.073	13.749	3350	100.1	1.2585	23.688	2975	1.552	4618	2.588	0.29051	27.490	0.3645	5246	20.847	190.8	0.80	0.67
COMBUSTOR	0	39	32	4													
57.797	56.667	4091	522.6	1.2302	23.390	3271											
57.797	11.425	2960	45.6	1.2774	23.433	2832	1.725	4885	2.570	0.28600	27.490	0.3753	5272	21.713	191.8	0.80	0.59
COMBUSTOR	0	40	33	7													
58.817	97.242	3341	518.3	1.2750	22.674	3058											
58.817	6.225	1758	-86.9	1.3328	22.647	2268	2.414	5476	2.478	0.28418	27.490	0.3777	5281	24.182	192.1	0.80	0.36
COMBUSTOR	0	41	34	6													
60.827	48.109	4674	510.9	1.1839	24.064	3381											
60.827	17.700	3984	154.8	1.2179	24.228	3159	1.338	4222	2.604	0.29407	27.490	0.3650	5262	19.293	191.4	0.80	0.83
COMBUSTOR	0	42	35	4													
62.247	51.017	4503	505.4	1.1983	23.885	3351											
62.247	18.275	3686	117.3	1.2364	24.002	3076	1.433	4407	2.593	0.30204	27.490	0.3553	5247	20.685	190.9	0.80	0.76
COMBUSTOR	0	43	36	4													
64.711	46.169	4629	494.0	1.1864	24.057	3369											
64.711	17.375	3951	148.8	1.2202	24.207	3147	1.321	4156	2.603	0.28630	27.490	0.3749	5219	18.491	189.9	0.80	0.82
COMBUSTOR	0	44	37	4													
65.087	41.320	4826	492.0	1.1680	24.289	3397											
65.087	19.403	4342	209.6	1.1890	24.489	3237	1.161	3759	2.617	0.26616	27.490	0.4032	5215	15.547	184.7	0.80	0.92
COMBUSTOR	0	45	38	4													
65.087	41.320	4975	605.3	1.1600	24.160	3446											
65.087	22.347	4597	364.4	1.1726	24.367	3317	1.047	3472	2.640	0.26616	27.490	0.4032	5275	14.393	191.9	0.80	0.92
NOZZLE	AE	46	39	5													
87.323	41.320	4826	492.0	1.1680	24.289	3397											
87.323	1.237	2578	-234.1	1.2768	24.651	2576	2.608	7235	2.617	0.05241	27.490	1.9371	6796	6.230	247.2	0.80	0.92
NOZZLE	P0	47	40	5													
87.323	41.320	4826	492.0	1.1680	24.289	3397											
87.323	0.388	1988	-766.7	1.2999	24.651	2283	3.476	7936	2.617	0.02470	27.490	4.3460	7213	3.046	242.4	0.80	0.92
NOZZLE	AE	48	41	5													
87.323	41.320	4975	605.3	1.1600	24.160	3446											
87.323	1.307	2773	-480.5	1.2693	24.650	2664	2.766	7371	2.640	0.05541	27.490	1.9371	6947	6.347	242.7	0.80	0.92
NOZZLE	P0	49	42	5													
87.323	41.320	4975	605.3	1.1600	24.160	3446											
87.323	0.388	2123	-719.2	1.2941	24.651	2354	3.458	8141	2.640	0.02372	27.490	4.3241	7405	3.001	249.4	0.80	0.92
NOZZLE	AE	50	43	5													
PICITIVE	COMBUSTOR	70	63	0													
65.087	247.443	5128	492.0	1.1758	24.632	3489											
65.087	0.388	1398	-1074.9	1.3242	24.968	1923	4.605	8855	2.471	0.03970	27.490	2.7036	7834	5.463	285.0	0.80	1.00
NOZZLE	P0	71	64	0													
87.323	23.141	4778	491.1	1.1617	24.234	3373											
87.323	1.657	3100	-393.4	1.2532	24.644	2802	2.320	6501	2.604	0.05541	27.490	1.9371	6376	5.597	231.9	0.80	0.92

ORIGINAL PAGE IS  
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READING = 0036 BLOCK = 129 TIME = 150.784 MACH 6.0 PT = 748.249 TT = 2984.0

XABS	P-IN	P-OUT	PDA	QOX	DAWALL	CAWALL
6.981400E-01	2.250999E-00	0.000000	-4.419103E-01	0.000000	2.470292E-02	2.470292E-02
3.070000E-01	2.250999E-00	0.000000	-2.574038E-02	0.000000	4.563589E-02	4.563589E-02
3.507999E-01	4.036313E-00	5.738031E-00	-5.294049E-02	0.000000	1.751353E-02	6.315188E-02
3.522473E-01	4.036313E-00	5.738031E-00	-5.294049E-02	0.000000	6.589332E-00	6.379045E-02
3.523075E-01	4.037121E-00	5.722100E-00	-5.299403E-02	0.000000	2.603124E-01	6.381707E-02
3.554999E-01	4.079999E-00	4.836710E-00	-5.350813E-02	0.000000	3.200993E-01	6.701804E-02
3.589674E-01	4.079199E-00	3.874997E-00	-5.464421E-02	-4.390535E-02	3.524806E-01	7.054285E-02
3.606000E-01	4.069999E-00	4.487213E-00	-5.525132E-02	-4.431548E-02	1.671649E-01	7.221448E-02
3.680000E-01	4.266624E-00	6.062210E-00	-5.634958E-02	-4.433987E-02	4.356322E-01	7.657078E-02
3.700999E-01	4.193000E-00	8.049698E-00	-5.833089E-02	-4.865002E-02	5.592490E-01	8.216326E-02
3.703674E-01	4.203227E-00	8.149998E-00	-5.840529E-02	-4.877761E-02	3.028487E-00	8.246009E-02
3.735675E-01	4.327582E-00	7.537498E-00	-5.956179E-02	-5.030649E-02	3.430470E-01	8.589656E-02
3.768675E-01	4.530228E-00	1.212500E-01	-6.143193E-02	-5.287881E-02	5.774443E-01	9.167100E-02
3.803000E-01	4.584999E-00	1.183264E-01	-6.166633E-02	-5.358738E-02	1.582084E-01	9.323308E-02
3.837675E-01	6.002106E-00	1.112499E-01	-6.246646E-02	-5.537954E-02	3.864824E-01	9.711790E-02
3.875000E-01	7.527466E-00	1.388452E-01	-6.337095E-02	-5.746882E-02	4.230817E-01	1.013487E-01
3.884676E-01	7.922868E-00	1.459999E-01	-6.346409E-02	-5.803882E-02	1.011494E-01	1.024502E-01
3.900999E-01	8.589998E-00	1.505209E-01	-6.350215E-02	-5.902832E-02	1.849352E-01	1.042495E-01
3.935675E-01	1.479931E-01	1.601248E-01	-6.427705E-02	-6.125291E-02	4.002357E-01	1.083019E-01
3.950000E-01	1.734998E-01	1.483203E-01	-6.490906E-02	-6.222150E-02	1.661751E-01	1.099636E-01
3.984676E-01	1.802615E-01	1.197500E-01	-6.668209E-02	-6.439272E-02	4.037988E-01	1.140016E-01
4.000000E-01	1.832498E-01	9.362061E-00	-6.771608E-02	-6.584434E-02	1.789186E-01	1.157908E-01
4.034676E-01	1.865995E-01	3.449995E-01	-6.854761E-02	-6.854761E-02	4.060828E-01	1.189516E-01
4.039999E-01	1.871831E-01	3.527100E-00	-7.116472E-02	-6.977493E-02	6.279948E-00	1.203796E-01
4.040999E-01	1.872813E-01	3.541565E-00	-7.124919E-02	-6.905601E-02	1.180970E-01	1.203977E-01
4.133177E-01	1.963452E-01	4.867373E-00	-7.924197E-02	-7.027944E-02	1.050247E-02	1.315001E-01
4.134174E-01	1.964435E-01	4.890374E-00	-7.931332E-02	-7.039635E-02	1.091435E-00	1.316170E-01
4.140675E-01	1.970828E-01	4.984997E-00	-7.981926E-02	-7.018108E-02	7.741240E-00	1.329312E-01
4.150000E-01	1.979999E-01	5.313217E-00	-8.053204E-02	-8.033808E-02	1.115060E-01	1.335062E-01
4.245999E-01	2.463748E-01	8.642368E-00	-8.700117E-02	-9.090012E-02	1.148230E-02	1.49885E-01
4.412675E-01	3.463147E-01	1.455936E-01	-9.715048E-02	-1.327051E-03	2.017109E-02	1.651596E-01
4.430998E-01	3.577966E-01	1.680273E-01	-9.849466E-02	-1.379189E-03	2.226224E-01	1.673858E-01
4.479999E-01	3.884988E-01	2.280176E-01	-1.016630E-01	-1.536448E-03	5.979283E-01	1.733651E-01
4.484174E-01	3.893886E-01	2.331274E-01	-1.019107E-01	-1.551008E-03	5.09298E-00	1.738750E-01
4.485000E-01	4.193703E-01	4.053347E-01	-1.002632E-01	-2.067407E-03	1.730289E-02	1.911779E-01
4.625999E-01	4.193830E-01	4.067398E-01	-1.002017E-01	-2.071242E-03	1.735325E-00	1.913014E-01
4.731000E-01	4.415373E-01	5.353052E-01	-8.784240E-02	-2.468633E-03	1.501889E-02	2.043202E-01
4.736674E-01	4.483205E-01	5.422498E-01	-8.687439E-02	-2.489812E-03	7.029281E-00	2.050231E-01
4.810999E-01	5.347498E-01	4.733521E-01	-7.479495E-02	-2.757007E-03	9.263397E-01	2.142865E-01
4.806675E-01	4.087622E-01	4.087622E-01	-6.040039E-02	-2.989088E-03	8.717886E-01	2.230044E-01
4.881674E-01	4.078369E-01	4.078369E-01	-6.018702E-02	-2.992282E-03	1.251180E-00	2.231295E-01
4.934676E-01	3.587082E-01	3.587082E-01	-4.950897E-02	-3.156513E-03	6.648273E-01	2.297778E-01
5.075674E-01	3.322408E-01	2.309998E-01	-6.405750E-02	-3.558012E-03	1.775535E-02	2.475331E-01
5.285675E-01	2.309998E-01	2.309998E-01	-6.950781E-01	-4.072309E-03	2.662979E-02	2.741629E-01
5.335675E-01	2.106247E-01	2.106247E-01	-1.269102E-02	-4.181281E-03	3.728382E-01	2.80357E-01
5.410675E-01	1.952274E-01	1.952274E-01	-2.054338E-02	-4.338235E-03	9.582100E-01	2.901778E-01
5.451999E-01	1.867436E-01	1.867436E-01	-2.458140E-02	-4.420005E-03	5.291309E-01	2.954091E-01
5.486674E-01	1.796248E-01	1.796248E-01	-2.780947E-02	-4.487440E-03	4.446402E-01	2.998555E-01
5.575999E-01	1.638914E-01	1.638914E-01	-3.550503E-02	-4.450055E-03	1.148041E-02	3.113359E-01
5.629175E-01	1.542255E-01	1.542255E-01	-5.218794E-02	-4.736017E-03	4.714038E-01	3.160499E-01
5.634676E-01	8.212498E-00	1.533565E-01	-5.262566E-02	-4.744910E-03	7.045183E-00	3.167544E-01
5.648676E-01	8.212498E-00	1.533565E-01	-5.262566E-02	-4.744910E-03	1.777214E-01	3.185316E-01
5.656674E-01	1.496817E-01	1.496817E-01	-5.422219E-02	-4.777808E-03	1.023519E-01	3.195592E-01
5.684676E-01	1.447499E-01	1.447499E-01	-5.614431E-02	-4.818582E-03	3.567197E-01	3.23223E-01
5.707275E-01	1.374940E-01	1.374940E-01	-5.751129E-02	-4.8850920E-03	2.883456E-01	3.260058E-01

READING = 0036 BLOCK = 129 TIME = 150.784 MACH 6.0 PT = 748.249 TT = 2984.0  
 XAB P-IN P-OUT PDA QOX DAWALL CAVALL  
 5.779675E 01 1.142500E 01 6.093020E 02 -4.950609E 03 9.262752E 01 3.352685E 03  
 5.801674E 01 6.224995E 00 6.297377E 02 -5.067582E 03 1.507153E 02 3.483400E 03  
 6.002675E 01 1.769998E 01 6.325317E 02 -5.526974E 03 2.578855E 02 3.741286E 03  
 6.224675E 01 1.627498E 01 6.325317E 02 -5.421879E 03 1.621893E 02 3.923975E 03  
 6.471075E 01 1.737498E 01 6.325317E 02 -5.736092E 03 3.161379E 02 4.239609E 03  
 6.508675E 01 2.128248E 01 6.325317E 02 -5.791477E 03 4.824060E 01 4.287848E 03  
 6.512675E 01 2.128248E 01 6.325317E 02 -5.791477E 03 5.134232E 00 4.294980E 03  
 6.522675E 01 2.025377E 01 6.325317E 02 -5.626137E 03 2.565889E 01 4.316372E 03  
 6.698676E 01 1.193848E 01 6.325317E 02 -5.626137E 03 2.565889E 01 4.316372E 03  
 6.758675E 01 6.57834E 00 9.923320E 02 -6.076047E 03 8.175694E 01 4.616289E 03  
 6.842674E 01 4.719998E 00 7.059219E 00 1.195639E 03 -6.131797E 03 9.480736E 01 4.711094E 03  
 6.914674E 01 3.615631E 00 4.984992E 00 1.325568E 03 -6.177052E 03 8.790805E 01 4.799000E 03  
 6.975674E 01 2.679998E 00 2.059082E 00 1.413379E 03 -6.222475E 03 7.402168E 01 4.873020E 03  
 6.995674E 01 2.505088E 00 1.099998E 00 1.463495E 03 -6.238003E 03 2.417622E 01 4.897195E 03  
 7.070674E 01 1.855912E 00 2.839998E 00 1.463495E 03 -6.238003E 03 9.022328E 01 4.987418E 03  
 7.113675E 01 1.479998E 00 2.610733E 00 1.583711E 03 -6.311222E 03 1.842812E 02 5.223719E 03  
 7.266675E 01 1.143021E 00 1.749998E 00 1.577719E 03 -6.311222E 03 1.842812E 02 5.223719E 03  
 7.281674E 01 1.109998E 00 1.607513E 00 1.583711E 03 -6.311222E 03 1.724117E 01 5.240457E 03  
 7.356674E 01 1.08561E 00 6.699998E-01 1.621879E 03 -6.325281E 03 8.453413E 01 5.324688E 03  
 7.37074E 01 1.085430E 00 6.65085E-01 1.623185E 03 -6.325359E 03 1.630043E-01 5.325648E 03  
 7.489674E 01 1.049998E 00 0.000000 1.643698E 03 -6.333842E 03 5.187865E 01 5.377523E 03  
 7.774675E 01 1.875000E 00 0.000000 1.704022E 03 -6.309031E 03 9.820615E 01 5.473727E 03  
 8.144674E 01 1.564999E 00 0.000000 1.777400E 03 -6.236652E 03 1.039644E 02 5.580688E 03  
 8.485674E 01 9.599991E-01 0.000000 1.803550E 03 -6.131949E 03 5.47251E 01 5.63258E 03  
 8.731674E 01 1.764999E 00 0.000000 1.838524E 03 -5.815592E 03 2.268561E 01 5.657941E 03  
 8.732275E 01 1.766693E 00 0.000000 1.838539E 03 -5.815592E 03 0.000000 5.657941E 03

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READING = 0036 BLOCK = 129 TIME = 158.784 MACH 6.0 PT = 748.249 TT = 2984.0

X	DDRAG	CDRAG	CF	HC
4.039999E 01	1.266055E 02	1.266055E 02	2.292762E-03	4.565425E-02
4.040999E 01	1.910272E-01	1.267965E 02	2.565889E-03	3.206221E-02
4.133174E 01	1.28086E 01	1.460773E 02	2.712055E-03	3.417094E-02
4.134174E 01	1.998075E-01	1.462771E 02	2.742705E-03	3.634655E-02
4.140675E 01	1.351410E 00	1.475285E 02	2.440232E-03	3.682233E-02
4.150000E 01	1.785275E 00	1.493138E 02	2.440960E-03	3.726414E-02
4.245999E 01	1.795654E 01	1.672704E 02	2.487395E-03	4.405836E-02
4.412675E 01	2.902185E 01	1.962922E 02	2.538233E-03	5.450863E-02
4.430998E 01	2.975372E 00	1.992676E 02	2.578079E-03	5.616935E-02
4.479999E 01	7.706939E 00	2.069745E 02	2.592804E-03	6.053048E-02
4.484174E 01	6.453706E-01	2.076199E 02	2.662764E-03	5.942142E-02
4.625000E 01	2.164850E 01	2.292684E 02	3.066336E-03	6.113527E-02
4.635999E 01	1.420377E-01	2.294104E 02	2.790696E-03	6.742650E-02
4.731000E 01	1.311222E 01	2.425256E 02	2.794382E-03	7.040024E-02
4.736674E 01	6.582503E-01	2.431839E 02	2.922312E-03	6.653061E-02
4.810999E 01	8.455266E 00	2.510391E 02	2.922312E-03	6.653061E-02
4.880675E 01	8.220353E 00	2.598594E 02	3.197857E-03	5.784253E-02
4.881674E 01	1.214915E-01	2.599807E 02	2.918384E-03	6.392807E-02
5.075674E 01	6.118028E 00	2.660986E 02	2.854405E-03	6.103639E-02
5.075674E 01	1.822700E 01	2.813264E 02	2.826073E-03	5.703524E-02
5.285675E 01	2.118916E 01	3.025154E 02	2.851365E-03	4.512507E-02
5.335675E 01	7.144500E 00	3.072966E 02	2.964089E-03	4.088582E-02
5.410675E 01	7.555296E 00	3.152849E 02	2.938436E-03	3.893488E-02
5.451999E 01	4.122132E 00	3.194070E 02	2.959717E-03	3.742104E-02
5.486674E 01	3.420899E 00	3.228354E 02	2.961492E-03	3.635338E-02
5.575999E 01	4.524873E 00	3.344620E 02	2.936862E-03	3.422545E-02
5.629175E 01	3.098414E 00	3.353580E 02	2.914484E-03	3.077951E-02
5.634676E 01	4.382560E-01	3.399968E 02	3.078830E-03	2.497834E-02
5.648676E 01	1.146297E 00	3.361431E 02	2.892882E-03	2.661674E-02
5.656674E 01	6.624908E-01	3.368054E 02	3.301253E-03	2.691670E-02
5.684676E 01	2.311646E 00	3.391169E 02	3.064808E-03	2.821270E-02
5.707275E 01	1.818949E 00	3.409358E 02	3.041374E-03	2.755343E-02
5.779675E 01	5.375837E 00	3.468716E 02	2.981278E-03	2.496074E-02
5.881674E 01	8.754619E 00	3.550260E 02	2.855891E-03	1.718358E-02
6.082675E 01	1.534903E 01	3.709749E 02	2.620243E-03	3.644995E-02
6.224675E 01	1.052165E 01	3.814963E 02	3.158019E-03	2.911446E-02
6.471075E 01	1.944955E 01	4.004458E 02	3.123579E-03	2.981645E-02
6.508675E 01	2.617290E 00	4.035630E 02	3.252233E-03	2.936823E-02
6.512675E 01	2.855140E-01	4.034284E 02	3.400224E-03	2.929561E-02
6.532675E 01	1.361972E 01	4.051902E 02	3.396163E-03	2.908332E-02
6.698676E 01	1.152901E 01	4.167190E 02	3.309682E-03	2.232883E-02
6.765675E 01	4.278721E 00	4.209976E 02	3.286705E-03	2.014477E-02
6.842674E 01	4.814135E 00	4.255115E 02	3.231371E-03	1.546831E-02
6.914674E 01	3.616368E 00	4.291277E 02	3.189572E-03	1.248254E-02
6.975674E 01	2.440837E 00	4.315684E 02	3.110521E-03	8.129995E-03
6.995674E 01	6.233370E-01	4.321917E 02	3.074554E-03	6.631423E-03
7.070674E 01	3.19370E 00	4.345110E 02	3.109119E-03	8.064986E-03
7.113675E 01	1.385650E 00	4.358965E 02	3.091160E-03	7.281128E-03
7.206675E 01	4.282434E 00	4.401787E 02	3.042646E-03	5.659077E-03
7.381674E 01	3.523118E-01	4.405310E 02	3.031132E-03	5.329859E-03
7.356674E 01	1.477606E 00	4.420085E 02	2.966901E-03	3.796509E-03
7.357074E 01	2.438873E-03	4.420107E 02	2.966496E-03	3.787862E-03
7.489674E 01	8.263643E-01	4.428369E 02	2.983647E-03	4.335330E-03
7.774675E 01	2.003700E 00	4.448406E 02	3.048901E-03	6.744720E-03
8.164674E 01	2.386306E 00	4.472268E 02	3.004514E-03	5.842306E-03
8.445674E 01	1.010281E 00	4.482371E 02	2.925691E-03	3.989078E-03

READING = 0030 BLOCK = 129 TIME = 158.784 NACH 6.0 PT = 748.249 TT = 2984.0

HC

CF

CDRAG

DDRAG

8.731674E 01 4.360071E-01 4.486729E 02 2.994716E-03 6.341346E-03  
 8.732275E 01 0.000000 4.486729E 02 2.994716E-03 6.345917E-03



READING = 0036 BLOCK = 129 TIME = 150.784 MACH 6.0 PT = 748.249 TT = 2980.0

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# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1362. (LBF)  
 MEASURED THRUST..... 1700. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1912. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2306. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5453  
 MEASURED THRUST COEFFICIENT..... 0.6806

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 6518. (LBF)  
 NET THRUST..... 1504. (LBF)  
 SPECIFIC IMPULSE..... 2111. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.6020

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9836  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1577  
 DELTA PT2..... 0.1216 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3302  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1601  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8877  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9049  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9181  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8757  
 ENTHALPY AT PU - SUPERSONIC..... -0.68 (BTU/LBM)  
 ENTHALPY AT PU - SUBSONIC..... 28.84 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0264  
 EQUIVALENCE RATIO..... 0.795  
 COMBUSTOR EFFICIENCY..... 0.920  
 TOTAL PRESSURE RATIO..... 0.1670  
 COMBUSTOR EFFECTIVENESS..... 0.8301  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT - C8..... 0.9383  
 NOZZLE COEFFICIENT - C7..... 0.8974  
 PROCESS EFFICIENCY..... 0.8030  
 KINETIC ENERGY EFFICIENCY..... 0.8587

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 126.6 (LBF)  
 INLET MOMENTUM CHANGE..... -638.3 (LBF)  
 COMBUSTOR FRICTION DRAG..... 277.0 (LBF)  
 COMBUSTOR STRUT DRAG..... 27.55 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 1040. (LBF)  
 NOZZLE FRICTION DRAG..... 45.11 (LBF)  
 NOZZLE STRUT DRAG..... 0.06 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1161. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1206. (LBF)  
 EXTERNAL FRICTION DRAG..... 66.40 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -983. (LBF)  
 TOTAL EXTERNAL DRAG..... -1049. (LBF)  
 TOTAL STRUT DRAG..... 27.55 (LBF)  
 CAVITY FORCE..... -1281. (LBF)  
 CALCULATED LOAD CELL FORCE..... -968. (LBF)  
 MEASURED LOAD CELL FORCE..... -630. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3868 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.231 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.571 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.323 (IN)  
 STRUT LEADING EDGE..... 56.487 (IN)  
 STRUT TRAILING EDGE..... 65.087 (IN)  
 COMBUSTOR EXIT..... 65.087 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.332	B
1C	44.300	
2A	48.807	D
2C	46.254	E
3A	54.097	
3B	56.282	
4	44.832	

READING = 0030 BLOCK = 145 TIME = 173.184 MACH 6.0 PT = 747.999 TT = 2971.6  
RAMJET PERFORMANCE

S U M M A R Y R E P O R T

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MONTH	O	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	747.999	2972	640.8	1.2935	28.972	2568											
0.000	0.386	401	32.6	1.3488	28.971	981	6.002	5890	1.824	0.10622	26.818	0.9857	5007	9.723	186.7		
SPIKE TIP NS	2	0	5														
0.600	18.125	2972	640.8	1.2934	28.971	2568											
0.600	16.404	2965	640.7	1.2950	28.971	2541	0.395	1003	2.079	0.10622	26.818	0.9857	1978	1.656	185.6		
WIND TUNNEL	3	0	0														
0.000	747.999	2972	640.8	1.2935	28.972	2568											
0.000	0.382	400	32.9	1.3488	28.971	980	6.012	5891	1.824	0.10545	26.824	0.9857	1972	9.655	186.7		
SPIKE TIP NS	4	0	0														
0.600	18.125	2972	640.8	1.2934	28.971	2568											
0.600	16.432	2966	641.0	1.2956	28.972	2542	0.391	995	2.079	0.10545	26.824	0.9857	1972	1.630	186.7		
INLET THROAT	5	0	4														
40.400	247.013	2881	633.6	1.2904	28.972	2532											
40.400	17.121	1504	243.3	1.3476	28.971	1865	2.370	4420	1.891	0.94303	26.818	0.1110	4171	64.772	155.5		
INLET UPNRSK	6	0	3														
40.400	247.013	2881	633.6	1.2904	28.972	2532											
40.400	14.661	1445	227.6	1.3509	28.971	1830	2.463	4508	1.891	0.85731	26.818	0.1221	4216	60.053	157.2		
INLET DNRSK	7	0	4														
40.400	119.178	2881	633.6	1.2904	28.972	2532											
40.400	101.412	2777	602.3	1.2998	28.972	2489	0.503	1252	1.941	0.83731	26.818	0.1221	4216	16.680	157.2		
COMBUSTOR	8	1	21														
40.410	203.221	2851	636.2	1.2984	27.853	2571											
40.410	11.501	1407	214.2	1.3542	27.853	1844	2.492	4596	1.946	0.94588	26.902	0.1110	4170	67.555	155.0	0.09	0.07
COMBUSTOR	9	2	21														
41.314	157.730	2785	638.0	1.3021	26.725	2598											
41.314	12.921	1506	248.9	1.3592	26.725	1945	2.269	4415	2.042	0.93059	26.992	0.1109	4069	65.191	150.7	0.19	0.04
COMBUSTOR	10	3	21														
41.324	165.558	2745	638.0	1.3040	26.683	2583											
41.324	12.936	1462	249.1	1.3529	26.682	1920	2.298	4411	2.035	0.93146	26.992	0.1108	4068	65.229	150.7	0.19	0.01
COMBUSTOR	11	4	21														
41.389	165.333	2738	637.6	1.3083	26.676	2580											
41.389	13.039	1461	250.7	1.3530	26.676	1920	2.292	4400	2.034	0.93187	26.992	0.1107	4061	65.091	150.5	0.19	0.00
COMBUSTOR	12	5	21														
41.500	164.932	2735	637.0	1.3044	26.675	2579											
41.500	13.773	1482	256.8	1.3520	26.675	1932	2.258	4362	2.034	0.93161	26.992	0.1107	4050	64.510	150.1	0.19	0.00
COMBUSTOR	13	6	21														
42.460	159.065	2715	630.4	1.3051	26.675	2570											
42.460	22.927	1691	317.4	1.3415	26.675	2056	1.925	3958	2.034	0.94271	26.992	0.1118	3977	57.979	147.3	0.19	0.00
COMBUSTOR	14	7	6														
44.109	112.600	3158	613.6	1.2837	27.214	2721											
44.109	38.478	2872	343.8	1.3068	27.215	2429	1.365	3317	2.094	0.90928	26.992	0.1159	3925	46.866	145.4	0.19	0.47
COMBUSTOR	15	8	3														
44.310	110.852	3185	611.1	1.2823	27.254	2730											
44.310	39.979	2927	399.4	1.3043	27.255	2452	1.327	3254	2.096	0.90806	26.992	0.1161	3918	45.923	145.2	0.19	0.50
COMBUSTOR	16	0	3														
44.800	107.467	3242	604.3	1.2792	27.343	2746											
44.800	43.633	2849	411.8	1.2994	27.344	2501	1.241	3103	2.101	0.90454	26.992	0.1165	3905	43.622	144.7	0.19	0.57
COMBUSTOR	17	10	2														
46.824	107.370	3244	603.9	1.2791	27.345	2747											
46.824	43.759	2852	412.1	1.2992	27.347	2503	1.238	3098	2.101	0.90455	26.992	0.1165	3905	43.547	144.7	0.19	0.58
COMBUSTOR	18	11	6														
46.250	94.702	3021	603.1	1.2915	28.422	2818											
46.250	51.327	2593	451.7	1.3059	28.422	2826	1.048	2753	2.275	0.86104	27.254	0.1236	3956	36.833	145.2	0.49	0.24

READING = 0036 BLOCK = 145 TIME = 173.184 MACH 6.0 PT = 747.999 TT = 2971.6

P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/C	MOMTH	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2												
46.260	99.676	3023	602.9	1.2914	24.424	2819										
46.260	51.380	2395	451.7	1.3058	24.424	2627	1.007	2751	2.275	0.80067	27.254	0.1236	3957	46.792	145.2	0.49 0.24
COMBUSTOR	0	20	13	4												
47.310	95.971	3233	586.8	1.2808	24.681	2888										
47.310	56.951	2378	458.6	1.2929	24.682	2738	0.925	2533	2.292	0.80073	27.254	0.1320	4084	31.524	144.9	0.49 0.35
COMBUSTOR	0	21	14	3												
47.349	95.799	3246	586.3	1.2801	24.696	2892										
47.349	57.190	2394	458.9	1.2922	24.698	2744	0.920	2524	2.293	0.79715	27.254	0.1335	4093	31.267	150.2	0.49 0.36
COMBUSTOR	0	22	15	4												
48.110	92.279	3464	575.2	1.2687	24.956	2959										
48.110	54.625	3094	438.4	1.2819	24.960	2811	0.931	2616	2.310	0.74603	27.254	0.1426	4212	30.331	154.5	0.49 0.46
COMBUSTOR	0	23	16	6												
48.789	87.650	3198	585.6	1.2843	22.021	3045										
48.789	42.877	2720	395.0	1.3004	22.023	2826	1.093	3088	2.514	0.69374	27.577	0.1582	4351	33.294	157.8	0.85 0.27
COMBUSTOR	0	24	17	2												
48.799	87.598	3200	585.4	1.2842	22.024	3046										
48.799	42.760	2721	394.2	1.3005	22.025	2826	1.095	3093	2.514	0.69284	27.577	0.1584	4353	33.308	157.9	0.85 0.27
COMBUSTOR	0	25	18	4												
49.329	85.192	3306	578.9	1.2788	22.135	3081										
49.329	36.554	2732	350.0	1.2984	22.138	2824	1.198	3384	2.524	0.64796	27.577	0.1662	4456	34.079	161.6	0.85 0.30
COMBUSTOR	0	26	19	5												
50.739	76.196	3769	563.0	1.2535	22.615	3223										
50.739	35.125	3207	326.0	1.2750	22.617	2997	1.149	3443	2.504	0.59224	27.577	0.1950	4705	29.550	170.6	0.85 0.44
COMBUSTOR	0	27	20	4												
52.039	71.075	4040	542.7	1.2360	22.939	3290										
52.039	23.812	3244	198.6	1.2687	22.949	2965	1.390	4149	2.582	0.45203	27.577	0.2379	5007	29.185	181.6	0.85 0.54
COMBUSTOR	0	28	21	2												
53.239	71.068	4029	538.4	1.2367	22.937	3286										
53.239	21.367	3160	167.3	1.2719	22.968	2959	1.465	4320	2.581	0.43413	27.577	0.2480	5060	29.140	183.5	0.85 0.54
COMBUSTOR	0	29	22	4												
54.089	69.180	4098	532.2	1.2318	23.024	3302										
54.089	19.713	3190	138.7	1.2695	23.062	2955	1.502	4437	2.586	0.40922	27.577	0.2631	5132	28.219	186.1	0.85 0.57
COMBUSTOR	0	30	23	3												
54.520	68.370	4125	528.8	1.2298	23.061	3307										
54.520	18.762	3191	122.7	1.2689	23.102	2952	1.527	4508	2.588	0.39627	27.577	0.2717	5169	27.761	187.5	0.85 0.58
COMBUSTOR	0	31	24	3												
54.849	67.880	4140	526.3	1.2287	23.082	3310										
54.849	18.037	3183	110.1	1.2689	23.126	2947	1.549	4563	2.589	0.38698	27.577	0.2762	5197	27.444	188.4	0.85 0.58
COMBUSTOR	0	32	25	4												
55.760	66.316	4189	519.8	1.2250	23.150	3320										
55.760	16.450	3184	80.4	1.2679	23.200	2941	1.594	4689	2.592	0.36368	27.577	0.2901	5266	26.500	191.0	0.85 0.60
COMBUSTOR	0	33	26	5												
56.274	52.252	4054	516.5	1.1887	23.644	3403										
56.274	15.355	3783	89.5	1.2311	23.801	3119	1.482	4622	2.629	0.29272	27.577	0.3678	5427	21.028	196.8	0.85 0.77
COMBUSTOR	0	34	27	5												
56.329	60.868	4221	516.2	1.2219	23.194	3325										
56.329	11.761	3056	8.5	1.2719	23.253	2883	1.748	5040	2.601	0.29185	27.577	0.3689	5431	22.860	197.0	0.85 0.62
COMBUSTOR	0	35	28	3												
56.469	60.339	4228	515.3	1.2214	23.202	3326										
56.469	11.439	3057	4.8	1.2718	23.262	2882	1.753	5054	2.601	0.28970	27.577	0.3717	5440	22.755	197.3	0.85 0.62
COMBUSTOR	0	36	29	21												
56.549	47.261	5060	514.9	1.1525	24.123	3467										
56.549	15.075	4388	73.9	1.1750	24.524	3233	1.453	4698	2.643	0.29299	27.577	0.3675	5445	21.389	197.5	0.85 1.00
COMBUSTOR	0	37	30	21												
56.829	47.413	5058	513.3	1.1526	24.126	3466										
56.829	14.587	4364	59.7	1.1763	24.534	3225	1.477	4764	2.643	0.29197	27.577	0.3688	5461	21.617	198.0	0.85 1.00

READING = 0036 BLOCK = 145 TIME = 173.184 MACH 6.0 PT = 747.999 TT = 2971.0

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MONTH	U	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	21													
57.055	47.405	5057	512.0	1.1526	24.128	3466											
57.055	13.966	4335	43.3	1.1779	24.546	3216	1.506	4843	2.642	0.29142	27.577	0.3695	5472	21.933	198.4	0.85	1.00
COMBUSTOR	0	39	32	21													
57.779	46.436	5050	508.0	1.1526	24.130	3463											
57.779	11.975	4247	-6.1	1.1827	24.579	3188	1.591	5072	2.643	0.28690	27.577	0.3753	5499	22.616	194.4	0.85	1.00
COMBUSTOR	0	40	33	21													
58.799	37.636	5020	503.4	1.1508	24.109	3452											
58.799	6.412	3771	-146.1	1.1970	24.651	3099	1.840	5701	2.660	0.28508	27.577	0.3777	5507	25.257	194.7	0.85	1.00
COMBUSTOR	0	41	34	21													
60.809	49.624	5044	495.6	1.1539	24.155	3461											
60.809	17.050	4351	95.7	1.1743	24.514	3248	1.377	4473	2.635	0.29500	27.577	0.3650	5484	20.508	198.9	0.85	1.00
COMBUSTOR	0	42	35	21													
62.229	50.272	5039	489.8	1.1543	24.165	3459											
62.229	16.537	4375	62.7	1.1775	24.540	3231	1.431	4623	2.633	0.30299	27.577	0.3553	5468	21.768	198.3	0.85	1.00
COMBUSTOR	0	43	36	21													
64.693	47.510	5019	477.7	1.1543	24.173	3452											
64.693	16.307	4353	109.0	1.1752	24.504	3256	1.319	4295	2.635	0.28720	27.577	0.3749	5439	19.171	197.2	0.85	1.00
COMBUSTOR	0	44	37	200													
65.069	44.119	5008	475.5	1.1537	24.167	3448											
65.069	20.183	4349	176.0	1.1676	24.451	3267	1.190	3910	2.641	0.26700	27.577	0.4032	5435	16.222	197.1	0.85	1.00
COMBUSTOR	0	45	38	4													
65.069	44.119	5140	598.0	1.1483	23.998	3497											
65.069	19.608	4681	270.6	1.1586	24.335	3329	1.216	4048	2.605	0.26700	27.577	0.4032	5495	16.796	194.2	0.85	1.00
NOZZLE	AE	46	39	5													
87.305	44.119	5008	475.5	1.1537	24.167	3448											
87.305	1.314	2333	-692.4	1.2624	24.755	2480	2.791	7479	2.641	0.05558	27.577	1.9371	7063	6.461	236.1	0.85	1.00
NOZZLE	PO	47	40	5													
87.305	44.119	5008	475.5	1.1537	24.167	3448											
87.305	0.386	2175	-867.7	1.2872	24.757	2371	3.483	8259	2.641	0.02348	27.577	4.5805	7532	3.013	273.1	0.85	1.00
NOZZLE	AE	48	41	5													
87.305	44.119	5140	598.0	1.1483	23.998	3497											
87.305	1.390	3047	-558.2	1.2531	24.751	2769	2.747	7607	2.665	0.05558	27.577	1.9371	7210	6.570	261.4	0.85	1.00
NOZZLE	PO	49	42	5													
87.305	44.119	5140	598.0	1.1483	23.998	3497											
87.305	0.386	2325	-833.4	1.2813	24.757	2446	3.460	8463	2.665	0.02251	27.577	4.7837	7727	2.960	280.2	0.85	1.00
FICTIVE	COMBUSTOR	70	63	0													
65.069	247.013	5183	475.5	1.1711	24.305	3519											
65.069	0.386	1442	-1140.1	1.3242	24.757	1958	4.591	8991	2.500	0.03854	27.577	2.7934	7983	5.386	284.5	0.85	1.00
FICTIVE	NOZZLE	71	64	0													
87.305	25.101	4901	474.2	1.1488	24.096	3422											
87.305	1.730	3355	-431.5	1.2359	24.737	2867	2.332	6732	2.687	0.05558	27.577	1.9371	6629	5.815	240.4	0.85	1.00

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READING = 0036 BLOCK = 145 TIME = 173.184 MACH 6.0 PT = 747.999 TT = 2971.0

XAB8	P-IN	P-OUT	POA	QOX	DAWALL	CAWALL
6.981400E-01	2.274999E 00	0.000000	-4.415444E-01	0.000000	2.470292E-02	2.470292E-02
3.070000E 01	2.274999E 00	0.000000	-2.596824E 02	0.000000	4.563589E 02	4.563589E 02
3.507999E 01	4.032497E 00	0.000000	-4.000091E 02	0.000000	1.751353E 02	6.315188E 02
3.520677E 01	4.056706E 00	5.709152E 00	-5.312761E 02	0.000000	5.590900E 00	6.371096E 02
3.521278E 01	4.051570E 00	5.693653E 00	-5.313386E 02	0.000000	2.659509E-01	6.371353E 02
3.554999E 01	4.099998E 00	4.823471E 00	-5.373487E 02	0.000000	3.380788E 01	6.711833E 02
3.587878E 01	4.090338E 00	3.974998E 00	-5.415414E 02	0.000000	5.342203E 01	7.046092E 02
3.606000E 01	4.084999E 00	4.634089E 00	-5.547432E 02	-4.550242E 02	1.856190E 01	7.231670E 02
3.648000E 01	4.266277E 00	6.163620E 00	-5.671009E 02	-4.709988E 02	4.563113E 01	7.667981E 02
3.700999E 01	4.219999E 00	8.093002E 00	-5.83192E 02	-5.059510E 02	5.604901E 01	8.238477E 02
3.701078E 01	4.221464E 00	8.124990E 00	-5.879314E 02	-5.059191E 02	9.382711E-01	8.237895E 02
3.73379E 01	4.237478E 00	7.324990E 00	-5.971465E 02	-5.220728E 02	3.429109E 01	8.380769E 02
3.786879E 01	4.363132E 00	1.202500E 01	-6.192073E 02	-5.491104E 02	5.770821E 01	9.157849E 02
3.835880E 01	5.745453E 00	1.169875E 01	-6.175002E 02	-5.574949E 02	1.780333E 01	9.335881E 02
3.875000E 01	7.358145E 00	1.103392E 01	-6.21487E 02	-5.758436E 02	3.666499E 01	9.702576E 02
3.882880E 01	7.358145E 00	1.387720E 01	-6.327034E 02	-5.990293E 02	4.429424E 01	1.014552E 03
3.900999E 01	8.429998E 00	1.444999E 01	-6.330893E 02	-6.040049E 02	8.700709E 00	1.023292E 03
3.933879E 01	1.443213E 01	1.614998E 01	-6.400547E 02	-6.392957E 02	2.081007E 01	1.044063E 03
3.950000E 01	1.737498E 01	1.469409E 01	-6.471733E 02	-6.514231E 02	3.793811E 01	1.082000E 03
3.982880E 01	1.806544E 01	1.172500E 01	-6.650659E 02	-6.772291E 02	1.871092E 01	1.100711E 03
4.000000E 01	1.842497E 01	8.977051E 00	-6.760950E 02	-6.922082E 02	3.826300E 01	1.138974E 03
4.032880E 01	1.904695E 01	3.099990E 01	-7.049998E 02	-7.212568E 02	2.001353E 01	1.158988E 03
4.039999E 01	1.918164E 01	3.789017E 00	-7.120012E 02	-7.213568E 02	3.853186E 01	1.197519E 03
4.040999E 01	1.920055E 01	3.801498E 00	-7.129567E 02	-7.279919E 02	8.360975E 00	1.205880E 03
4.131378E 01	2.091022E 01	4.931244E 00	-7.951306E 02	-7.289346E 02	1.180970E 00	1.207061E 03
4.132378E 01	2.092914E 01	4.943741E 00	-7.959895E 02	-8.357454E 02	1.069012E 02	1.313463E 03
4.138879E 01	2.105212E 01	5.024997E 00	-8.014534E 02	-8.371753E 02	1.167598E 02	1.315130E 03
4.150000E 01	2.126248E 01	6.283930E 00	-8.104324E 02	-8.464001E 02	7.738074E 00	1.322866E 03
4.245999E 01	2.672498E 01	1.714990E 01	-8.605059E 02	-8.643214E 02	1.524474E 01	1.336112E 03
4.410880E 01	4.114380E 01	3.581247E 01	-8.923518E 02	-1.495823E 03	1.140962E 02	1.451010E 03
4.430998E 01	4.265918E 01	3.729610E 01	-8.954607E 02	-1.564148E 03	1.995492E 02	1.650566E 03
4.479999E 01	4.633498E 01	4.091650E 01	-9.009297E 02	-1.749021E 03	2.441451E 01	1.734777E 03
4.482378E 01	4.642674E 01	4.109204E 01	-9.012991E 02	-1.757565E 03	5.980318E 01	1.734777E 03
4.625000E 01	5.102928E 01	5.162378E 01	-9.281929E 02	-2.346147E 03	2.904090E 00	1.737681E 03
4.625999E 01	5.106154E 01	5.169751E 01	-9.272917E 02	-2.350361E 03	1.752235E 02	1.912905E 03
4.731000E 01	5.444998E 01	5.945117E 01	-9.670412E 02	-2.788038E 03	1.249086E 00	1.914154E 03
4.734879E 01	5.464272E 01	5.973749E 01	-9.677609E 02	-2.804001E 03	1.301948E 02	2.044349E 03
4.810999E 01	5.842499E 01	5.082471E 01	-5.505867E 02	-3.108430E 03	4.780540E 00	2.049129E 03
4.878879E 01	4.287695E 01	4.287695E 01	-4.024541E 02	-3.354809E 03	9.489055E 01	2.144020E 03
4.879878E 01	4.275977E 01	4.275977E 01	-4.002170E 02	-3.358325E 03	8.493382E 01	2.228953E 03
4.932880E 01	3.655414E 01	3.655414E 01	-2.906570E 02	-3.538799E 03	1.252718E 00	2.230206E 03
5.073878E 01	3.512498E 01	3.512498E 01	-2.90725E 02	-4.537480E 03	6.648273E 01	2.296688E 03
5.283879E 01	3.381208E 01	2.381208E 01	-3.571963E 02	-4.655750E 03	1.775520E 02	2.474240E 03
5.333879E 01	2.136664E 01	2.136664E 01	-4.369778E 02	-4.826035E 03	2.662993E 02	2.740540E 03
5.408879E 01	1.971307E 01	1.971307E 01	-4.790172E 02	-4.918273E 03	6.372684E 01	2.804266E 03
5.451999E 01	1.876239E 01	1.876239E 01	-5.101526E 02	-4.918273E 03	9.582100E 01	2.900087E 03
5.484879E 01	1.803748E 01	1.803748E 01	-5.095707E 02	-5.168387E 03	5.521524E 01	2.955302E 03
5.575999E 01	1.644977E 01	1.644977E 01	-5.849570E 02	-5.168387E 03	4.216342E 03	2.997466E 03
5.627379E 01	1.555453E 01	1.555453E 01	-7.533496E 02	-5.259214E 03	1.17157E 02	3.114581E 03
5.632880E 01	8.062494E 00	1.545860E 01	-7.577561E 02	-5.268211E 03	4.591949E 01	3.160500E 03
5.646880E 01	8.062494E 00	1.521475E 01	-7.677495E 02	-5.290522E 03	7.045183E 00	3.160500E 03
5.654680E 01	1.507538E 01	1.507538E 01	-7.738318E 02	-5.303789E 03	1.77224E 01	3.185318E 03
5.682880E 01	1.458749E 01	1.458749E 01	-7.931965E 02	-5.348230E 03	1.023519E 01	3.195553E 03
5.705479E 01	1.396599E 01	1.396599E 01	-8.070602E 02	-5.383406E 03	3.567197E 01	3.231225E 03
					2.883056E 01	3.260059E 03

READING = 0036 BLOCK = 145 TIME = 173.184 MACH 6.0 PT = 747.999 TT = 2971.0

XABS	P-IN	P-OUT	PDA	GOX	DAWALL	CRAWALL
5.77879E 01	1.197500E 01	1.197500E 01	8.422540E 02	-5.401824E 03	9.262752E 01	3.352687E 03
5.879878E 01	6.412492E 00	6.412492E 00	8.635460E 02	-5.018095E 03	1.307153E 02	3.483402E 03
6.050879E 01	1.764998E 01	1.764998E 01	8.663502E 02	-5.835006E 03	2.578555E 02	3.741287E 03
6.228879E 01	1.653748E 01	1.653748E 01	8.663502E 02	-5.996176E 03	1.821893E 02	3.923476E 03
6.409279E 01	1.830750E 01	1.830750E 01	8.663502E 02	-6.330327E 03	3.161379E 02	4.239613E 03
6.506879E 01	2.178748E 01	1.857759E 01	8.663502E 02	-6.309441E 03	4.824000E 01	4.287852E 03
6.510880E 01	2.178748E 01	1.860032E 01	8.663502E 02	-6.395727E 03	5.134232E 00	4.292984E 03
6.530879E 01	2.075866E 01	1.875000E 01	8.663502E 02	-6.426503E 03	2.565889E 01	4.318441E 03
6.656880E 01	1.219287E 01	9.779999E 00	1.034581E 03	-6.633727E 03	2.159020E 02	4.534539E 03
6.73879E 01	8.736816E 00	9.652498E 00	1.238875E 03	-6.695078E 03	8.175694E 01	4.616293E 03
6.840878E 01	4.764999E 00	7.333466E 00	1.447638E 03	-6.756754E 03	9.480736E 01	4.711098E 03
6.912878E 01	3.690399E 00	5.164999E 00	1.581003E 03	-6.808785E 03	8.790805E 01	4.799004E 03
6.973878E 01	2.779999E 00	2.111084E 00	1.655789E 03	-6.868629E 03	7.402168E 01	4.873023E 03
6.993878E 01	2.60296E 00	1.109999E 00	1.671487E 03	-6.880095E 03	2.417422E 01	4.897199E 03
7.068878E 01	1.926376E 00	2.829999E 00	1.725311E 03	-6.902117E 03	9.022320E 01	4.987422E 03
7.11879E 01	1.539999E 00	2.605118E 00	1.756143E 03	-6.92078E 03	5.202614E 01	5.039445E 03
7.248879E 01	1.157486E 00	1.804998E 00	1.838610E 03	-6.93816E 03	1.842812E 02	5.223723E 03
7.298878E 01	1.119999E 00	1.617493E 00	1.8474051E 03	-6.965910E 03	1.724117E 01	5.240061E 03
7.338878E 01	1.11499E 00	6.799994E-01	1.883273E 03	-6.979629E 03	8.453413E 01	5.325492E 03
7.35278E 01	1.114561E 00	6.750031E-01	1.884599E 03	-6.979715E 03	1.620043E-01	5.32552E 03
7.437878E 01	1.103000E 00	0.000000	1.908043E 03	-7.011770E 03	5.187865E 01	5.377327E 03
7.772879E 01	1.91998E 00	0.000000	1.968521E 03	-6.903141E 03	9.820615E 01	5.475730E 03
8.162078E 01	1.624999E 00	0.000000	2.047289E 03	-6.886684E 03	1.049644E 02	5.500691E 03
8.443878E 01	9.999992E-01	0.000000	2.073492E 03	-6.770410E 03	5.45251E 01	5.635262E 03
8.728878E 01	1.789999E 00	0.000000	2.107112E 03	-6.626559E 03	2.268561E 01	5.657945E 03
8.730479E 01	1.791656E 00	0.000000	2.107123E 03	-6.426020E 03	0.000000	5.657945E 03

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X	DDRG	CORAG	CF	HC
4.039999E 01	1.263997E 02	1.263997E 02	2.241070E-03	4.528810E-02
4.040999E 01	1.883349E-01	1.265880E 02	2.539070E-03	3.285010E-02
4.131378E 01	1.853036E 01	1.451184E 02	2.084198E-03	3.503103E-02
4.132378E 01	1.956924E-01	1.453141E 02	2.075620E-03	3.759487E-02
4.138879E 01	1.230220E 01	1.465443E 02	2.023558E-03	3.811170E-02
4.150000E 01	2.080879E 00	1.486252E 02	2.025466E-03	3.960038E-02
4.259999E 01	1.726779E 01	1.658929E 02	2.048234E-03	5.477715E-02
4.410880E 01	2.636029E 01	1.922792E 02	2.562420E-03	7.051373E-02
4.430998E 01	3.058149E 00	1.953374E 02	2.837330E-03	6.494600E-02
4.479999E 01	7.621667E 00	2.029592E 02	2.837330E-03	6.494600E-02
4.482378E 01	3.638901E-01	2.033231E 02	2.837330E-03	6.494600E-02
4.625000E 01	2.143111E 01	2.247542E 02	3.193618E-03	6.486958E-02
4.625999E 01	1.408805E-01	2.248947E 02	2.916609E-03	7.170278E-02
4.731000E 01	1.295555E 01	2.374502E 02	2.909760E-03	7.241893E-02
4.734879E 01	4.447742E-01	2.382950E 02	3.017049E-03	6.931934E-02
4.810999E 01	8.760155E 00	2.470551E 02	2.977839E-03	6.869751E-02
4.878079E 01	8.410740E 00	2.554659E 02	3.247870E-03	6.009990E-02
4.879878E 01	1.293651E-01	2.555952E 02	2.954232E-03	6.653037E-02
4.928800E 01	6.541938E 00	2.621370E 02	2.886687E-03	6.286010E-02
5.073078E 01	1.623692E 01	2.783738E 02	2.862231E-03	5.983215E-02
5.236879E 01	2.251717E 01	3.008490E 02	2.896231E-03	4.653411E-02
5.323879E 01	5.476839E 00	3.063677E 02	2.996899E-03	4.200918E-02
5.408879E 01	8.186674E 00	3.145522E 02	2.960273E-03	4.000800E-02
5.431999E 01	4.587801E 00	3.141418E 02	2.976831E-03	3.838518E-02
5.448879E 01	9.46812E 00	3.220064E 02	2.977381E-03	3.739495E-02
5.575999E 01	9.362193E 00	3.319085E 02	2.950132E-03	3.508077E-02
5.627379E 01	3.202206E 00	3.351752E 02	2.927472E-03	3.163077E-02
5.632880E 01	4.668273E-01	3.356818E 02	3.106088E-03	2.546935E-02
5.646880E 01	1.216236E 01	3.368579E 02	2.895004E-03	2.675483E-02
5.658878E 01	7.029199E-01	3.375608E 02	3.327863E-03	2.789100E-02
5.682880E 01	2.549026E 00	3.401096E 02	3.318299E-03	2.742728E-02
5.705479E 01	2.081366E 00	3.421909E 02	3.311612E-03	2.679071E-02
5.777879E 01	6.823593E 00	3.490144E 02	3.302862E-03	2.445792E-02
5.879878E 01	1.046015E 01	3.594744E 02	3.383371E-03	1.601813E-02
6.080879E 01	1.967139E 01	3.791488E 02	3.283795E-03	3.033085E-02
6.223879E 01	1.261537E 01	3.917610E 02	3.267625E-03	2.984414E-02
6.40279E 01	2.123167E 01	4.129924E 02	3.294180E-03	3.021330E-02
6.508879E 01	2.834881E 00	4.158271E 02	3.347315E-03	3.030004E-02
6.510880E 01	2.857336E-01	4.161128E 02	3.019282E-03	3.090018E-02
6.530879E 01	1.468067E 00	4.175808E 02	3.417380E-03	3.068321E-02
6.696880E 01	1.233529E 01	4.299150E 02	3.354001E-03	2.328293E-02
6.763879E 01	4.540881E 00	4.344558E 02	3.336935E-03	2.896403E-02
6.840878E 01	4.769568E 00	4.392233E 02	3.250073E-03	1.601961E-02
6.912878E 01	3.803649E 00	4.430288E 02	3.250073E-03	1.291960E-02
6.973878E 01	2.56001E 00	4.455894E 02	3.179085E-03	8.400429E-03
7.008878E 01	6.518256E-01	4.462410E 02	3.144094E-03	6.828353E-03
7.111879E 01	1.438556E 00	4.500859E 02	3.175178E-03	8.221123E-03
7.240878E 01	4.421273E 00	4.545071E 02	3.110397E-03	7.415045E-03
7.279878E 01	3.625491E-01	4.548696E 02	3.099161E-03	5.732618E-03
7.350878E 01	1.52414E 00	4.563945E 02	3.039868E-03	5.393412E-03
7.35278E 01	8.666379E-01	4.563970E 02	3.039497E-03	3.878711E-03
7.487878E 01	2.527360E-03	4.572634E 02	3.059534E-03	3.870180E-03
7.772879E 01	2.101854E 00	4.593652E 02	3.116410E-03	4.551813E-03
8.162878E 01	2.492078E 00	4.611579E 02	3.074870E-03	6.920080E-03
8.443878E 01	1.060076E 00	4.629180E 02	2.997291E-03	6.054640E-03
				4.139237E-03

READING = 0036 BLOCK = 145 TIME = 173.184 MACH 6.0 PI = 747.999 TI = 2971.0

X	DDAG	CDRAG	CF	HC
8.729878E 01	4.538367E-01	4.633710E 02	3.000818E-03	6.458122E-03
8.730479E 01	0.000000	4.633710E 02	3.000925E-03	6.462634E-03

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# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... (LBF) 1619.  
 MEASURED THRUST..... (LBF) 1800.  
 CALCULATED SPECIFIC IMPULSE..... (LBF-SEC/LBM) 2134.  
 MEASURED SPECIFIC IMPULSE..... (LBF-SEC/LBM) 2372.  
 CALCULATED THRUST COEFFICIENT..... 0.6502  
 MEASURED THRUST COEFFICIENT..... 0.7227

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED  
 STREAM THRUST..... (LBF) 6766.  
 NET THRUST..... (LBF) 1757.  
 SPECIFIC IMPULSE..... (LBF-SEC/LBM) 2315.  
 THRUST COEFFICIENT..... 0.7055

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... (LBF) 126.4  
 INLET MOMENTUM CHANGE..... (LBF) -938.4  
 COMBUSTOR FRICTION DRAG..... (LBF) 289.4  
 COMBUSTOR STRUT DRAG..... (LBF) 24.25  
 COMBUSTOR MOMENTUM CHANGE..... (LBF) 1265.  
 NOZZLE FRICTION DRAG..... (LBF) 47.55  
 NOZZLE STRUT DRAG..... (LBF) 0.00  
 NOZZLE MOMENTUM CHANGE..... (LBF) 1193.  
 NOZZLE PRESSURE INTEGRAL..... (LBF) 1241.  
 EXTERNAL FRICTION DRAG..... (LBF) 67.62  
 EXTERNAL PRESSURE INTEGRAL..... (LBF) -988.  
 TOTAL EXTERNAL DRAG..... (LBF) -1056.  
 TOTAL STRUT DRAG..... (LBF) 24.25  
 CAVITY FORCE..... (LBF) -1283.  
 CALCULATED LOAD CELL FORCE..... (LBF) -720.  
 MEASURED LOAD CELL FORCE..... (LBF) -539.  
 FUEL VACUUM SPECIFIC IMPULSE

## INLET

ANGLE OF ATTACK..... (DEGREES) 0.000  
 MASS FLOW RATIO..... 0.9857  
 ADDITIVE DRAG COEFFICIENT..... 0.0003  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1570  
 DELTA PT2..... (PSI) 0.1209  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3302  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1593  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8882  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9051  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9164  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8739  
 ENTHALPY AT PU - SUPERSONIC..... -1.74 (BTU/LBM)  
 ENTHALPY AT PU - SUBSONIC..... 27.67 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0283  
 EQUIVALENCE RATIO..... 0.846  
 COMBUSTOR EFFICIENCY..... 1.000  
 TOTAL PRESSURE RATIO..... 0.1786  
 COMBUSTOR EFFECTIVENESS..... 0.8819  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS..... 0.9385  
 NOZZLE COEFFICIENT - CT..... 0.8346  
 PROCESS EFFICIENCY..... 0.8040  
 KINETIC ENERGY EFFICIENCY..... 0.8596

## STATIONS

NOMINAL COWL LEADING EDGE..... 3/1.884 (IN)  
 SPIKE TRANSLATION..... 0.3288 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.213 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.553 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.305 (IN)  
 STRUT LEADING EDGE..... 56.469 (IN)  
 STRUT TRAILING EDGE..... 65.069 (IN)  
 COMBUSTOR EXIT..... 65.069 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.314	B
1C	44.300	
2A	48.789	D
2C	46.250	E
3A	54.079	
3B	56.204	
4	44.814	

Reading 38

$t = 96.24 \text{ sec.}$

READING = 0038 BLOCK = 67 TIME = 96.247 MACH 6.0 PT = 744.499 TT = 2965.5  
 RAMJET PERFORMANCE

## SUMMARY REPORT

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	AZAC	MORTM	W	IVAC	PMI	ETAC
WIND TUNNEL	1	0	5														
0.000	784.499	2966	658.9	1.2937	28.972	2506	0.005	5884	1.824	0.10571	26.762	0.9885	4991	9.666	186.5		
0.000	0.383	400	632.9	1.3988	28.971	980											
SPIKE TIP NS	2	0	5														
0.600	18.000	2965	658.9	1.2936	28.971	2506											
0.600	16.287	2899	638.8	1.2958	28.971	2539	0.395	1003	2.079	0.10571	26.762	0.9885	4958	1.648	185.3		
WIND TUNNEL	3	0	0														
0.000	784.499	2966	658.9	1.2937	28.972	2506											
0.000	0.379	399	633.2	1.3988	28.971	978	0.017	5805	1.824	0.10484	26.542	0.9885	4951	9.589	186.5		
SPIKE TIP NS	4	0	0														
0.600	18.000	2965	658.9	1.2936	28.971	2506											
0.600	16.319	2900	639.2	1.2957	28.972	2539	0.391	994	2.079	0.10484	26.542	0.9885	4951	1.619	186.5		
INLET THROAT	5	0	4														
00.400	236.142	2918	644.5	1.2953	28.972	2547											
00.400	17.573	1554	250.5	1.3449	28.971	1894	2.327	4407	1.898	0.93443	26.762	0.1118	4169	63.990	155.8		
INLET UPNRSK	6	0	3														
00.400	236.142	2918	644.5	1.2953	28.972	2547											
00.400	15.037	1493	240.2	1.3482	28.971	1858	2.420	4498	1.898	0.84948	26.762	0.1230	4215	59.381	157.5		
INLET DOWNRSK	7	0	4														
00.400	118.148	2918	644.5	1.2953	28.972	2547											
00.400	100.274	2810	612.3	1.2987	28.972	2503	0.507	1270	1.945	0.84948	26.762	0.1230	4215	16.763	157.5		
COMBUSTOR	8	0	4														
00.410	235.637	2918	644.5	1.2953	28.972	2547											
00.410	17.594	1555	250.8	1.3448	28.971	1894	2.325	4405	1.898	0.93431	26.762	0.1118	4168	63.953	155.7		
COMBUSTOR	9	0	3														
01.290	197.294	2911	642.4	1.2955	28.972	2544											
01.290	19.914	1675	289.0	1.3368	28.972	1962	2.144	4205	1.909	0.93738	26.762	0.1115	4066	61.259	151.9		
COMBUSTOR	10	3	5														
01.355	195.027	2910	642.2	1.2955	28.972	2544											
01.355	20.093	1683	291.3	1.3364	28.972	1966	2.131	4191	1.910	0.93790	26.762	0.1114	4059	61.080	151.7		
COMBUSTOR	11	4	5														
01.500	190.044	2908	641.7	1.2956	28.972	2543											
01.500	20.467	1701	296.2	1.3376	28.972	1976	2.104	4159	1.912	0.93807	26.762	0.1114	4043	60.624	151.1		
COMBUSTOR	12	5	5														
02.460	188.960	2896	638.0	1.2940	28.972	2538											
02.460	21.884	1773	315.9	1.3344	28.971	2015	1.992	4015	1.918	0.92882	26.762	0.1125	3970	57.950	148.3		
COMBUSTOR	13	6	5														
04.075	133.859	2872	630.7	1.2967	28.972	2528											
04.075	22.030	1802	323.7	1.3332	28.971	2030	1.931	3920	1.922	0.89849	26.762	0.1163	3917	54.731	146.3		
COMBUSTOR	14	7	5														
04.310	132.466	2868	629.7	1.2968	28.972	2526											
04.310	22.068	1804	324.3	1.3331	28.971	2032	1.924	3909	1.923	0.89826	26.762	0.1166	3910	54.442	146.1		
COMBUSTOR	15	8	5														
04.790	149.418	2861	627.6	1.2971	28.972	2524											
04.790	22.212	1812	326.4	1.3329	28.971	2030	1.907	3883	1.923	0.89245	26.762	0.1171	3890	53.848	145.6		
COMBUSTOR	16	9	5														
04.800	149.370	2861	627.6	1.2971	28.972	2524											
04.800	22.220	1812	326.4	1.3328	28.971	2036	1.907	3882	1.923	0.89253	26.762	0.1171	3895	53.844	145.5		
COMBUSTOR	17	10	5														
06.260	136.647	2842	621.9	1.2977	28.972	2516											
06.260	21.300	1820	328.6	1.3325	28.971	2040	1.878	3831	1.927	0.84055	26.762	0.1243	3865	50.041	144.4		
COMBUSTOR	18	11	5														
07.310	126.256	2830	618.1	1.2941	28.972	2511											
07.310	19.854	1815	327.3	1.3327	28.971	2037	1.872	3815	1.931	0.78231	26.762	0.1336	3852	46.377	143.9		

READING = 0038 BLOCK # 07 TIME = 90.247 MACH 0.0 PT = 744.499 TI = 2905.5

COMBUSTOR	P	1	19	12	5	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MORTM	Q	IVAC	PHI	ETAC
47.315	126.213	2830	618.1	1.2981	28.972	2511			1.072	3815	1.932	0.78208	26.762	0.1336	3852	46.362	143.9		
47.315	19.889	1815	327.3	1.3327	28.971	2037													
COMBUSTOR	0	20	13	5															
48.110	119.393	2820	615.3	1.2984	28.972	2507													
48.110	10.210	1795	321.7	1.3335	28.971	2027			1.091	3833	1.934	0.72908	26.762	0.1433	3857	43.427	144.1		
COMBUSTOR	0	21	14	5															
48.765	114.511	2813	613.2	1.2986	28.972	2504													
48.765	16.208	1757	311.3	1.3351	28.971	2006			1.937	3887	1.936	0.67236	26.762	0.1554	3878	40.611	144.9		
COMBUSTOR	0	22	15	4															
49.295	111.995	2807	611.6	1.2988	28.972	2501													
49.295	10.434	1719	301.2	1.3368	28.971	1986			1.984	3941	1.938	0.62881	26.762	0.1662	3901	38.510	145.8		
COMBUSTOR	0	23	16	5															
50.705	103.596	2794	607.6	1.2992	28.972	2496													
50.705	11.626	1645	280.9	1.3403	28.971	1945			2.079	4044	1.941	0.53592	26.762	0.1950	3944	33.678	147.4		
COMBUSTOR	0	24	17	4															
52.805	92.898	2778	602.9	1.2997	28.972	2489													
52.805	0.677	1569	260.4	1.3441	28.971	1902			2.176	4140	1.947	0.43925	26.762	0.2379	3984	28.258	148.9		
COMBUSTOR	0	25	18	4															
53.305	91.311	2775	601.4	1.2998	28.972	2488													
53.305	8.339	1509	255.2	1.3452	28.971	1891			2.202	4165	1.948	0.42130	26.762	0.2480	3995	27.266	149.3		
COMBUSTOR	0	26	19	4															
54.055	89.110	2770	600.3	1.3000	28.972	2486													
54.055	7.680	1522	248.1	1.3466	28.971	1876			2.238	4199	1.949	0.39713	26.762	0.2631	4010	25.912	149.8		
COMBUSTOR	0	27	20	4															
54.520	87.708	2767	599.5	1.3001	28.972	2485													
54.520	7.312	1507	244.0	1.3474	28.971	1867			2.229	4217	1.950	0.38300	26.762	0.2724	4018	25.142	150.1		
COMBUSTOR	0	28	21	4															
54.815	86.958	2765	599.0	1.3001	28.972	2484													
54.815	7.098	1498	241.7	1.3479	28.971	1862			2.271	4228	1.950	0.37554	26.762	0.2782	4023	24.677	150.3		
COMBUSTOR	0	29	22	5															
55.760	84.243	2760	597.4	1.3003	28.972	2482													
55.760	6.501	1474	235.1	1.3493	28.971	1847			2.305	4258	1.952	0.35215	26.762	0.2967	4036	23.302	150.8		
COMBUSTOR	0	30	23	4															
56.240	72.059	2758	596.7	1.3004	28.972	2481													
56.240	5.082	1435	225.0	1.3515	28.971	1825			2.364	4313	1.962	0.28407	26.762	0.3678	4062	19.040	151.8		
COMBUSTOR	0	31	24	5															
56.295	71.963	2757	596.6	1.3004	28.972	2481													
56.295	5.022	1434	224.7	1.3516	28.971	1824			2.365	4314	1.962	0.28322	26.762	0.3689	4063	18.989	151.8		
COMBUSTOR	0	32	25	5															
56.435	71.693	2757	596.4	1.3004	28.972	2480													
56.435	4.972	1431	224.0	1.3517	28.971	1822			2.369	4317	1.963	0.28114	26.762	0.3717	4064	18.862	151.9		
COMBUSTOR	0	33	26	5															
56.515	72.630	2756	596.3	1.3004	28.972	2480													
56.515	5.020	1430	223.6	1.3518	28.971	1821			2.371	4319	1.962	0.28423	26.762	0.3676	4065	19.077	151.9		
COMBUSTOR	0	34	27	5															
56.795	72.887	2755	596.0	1.3004	28.972	2480													
56.795	4.986	1425	222.4	1.3521	28.971	1819			2.377	4324	1.961	0.28354	26.762	0.3685	4067	19.052	152.0		
COMBUSTOR	0	35	28	5															
57.021	73.011	2754	595.7	1.3005	28.972	2479													
57.021	4.961	1422	221.6	1.3523	28.971	1817			2.382	4327	1.961	0.28291	26.762	0.3693	4068	19.023	152.0		
COMBUSTOR	0	36	29	5															
57.745	72.501	2751	594.6	1.3006	28.972	2478													
57.745	4.889	1415	219.6	1.3527	28.971	1812			2.391	4333	1.961	0.27882	26.762	0.3753	4070	18.749	152.1		
COMBUSTOR	0	37	30	4															
58.765	72.461	2747	593.6	1.3007	28.972	2476													
58.765	4.793	1408	217.9	1.3531	28.971	1808			2.398	4336	1.961	0.27665	26.762	0.3777	4070	18.642	152.1		

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READING = 0038 BLOCK = 67 TIME = 96.247 MACH 0.0 PI = 744.499 IT = 2905.5

	P	1	38	31	5	H	GAMMA	MOLWT	SDNY	MACH	VEL	S	M/A	M	A/AC	MMT/M	U	IVAC	FBI	ETAC
COMBUSTOR	0	38	31	5																
60.775	73.776	2741	591.6	1.3009	28.972	2474														
60.775	5000	1413	219.2	1.3528	28.971	1811	2.385	4317	1.959	0.28628	26.762	0.3050					19.206	151.6		
COMBUSTOR	0	39	32	5																
62.195	74.739	2737	590.4	1.3010	28.972	2472														
62.195	5.123	1419	220.6	1.3525	28.971	1815	2.370	4302	1.958	0.29404	26.762	0.3553					19.656	151.3		
NOZZLE	AE	40	33	2																
67.271	74.739	2737	590.4	1.3010	28.972	2472														
67.271	0.386	695	38.2	1.3942	28.971	1289	4.077	5257	1.958	0.05394	26.762	1.9370					4.407	170.4		
NOZZLE	PO	41	34	2																
67.271	74.739	2737	590.4	1.3010	28.972	2472														
67.271	0.383	696	38.5	1.3941	28.971	1291	4.072	5255	1.958	0.05422	26.762	1.9269					4.428	170.4		
FICTIVE	COMBUSTOR	64	37	0																
62.195	236.142	2736	590.4	1.3010	28.972	2472														
62.195	0.383	502	38.3	1.3949	28.971	1098	4.986	5474	1.879	0.07853	26.762	1.3340					6.663	175.0		
FICTIVE	NOZZLE	65	38	0																
67.271	63.207	2728	586.7	1.3015	28.972	2467														
67.271	0.411	740	40.2	1.3924	28.971	1330	3.899	5186	1.908	0.05394	26.762	1.9371					4.347	168.8		

READING = 0038 BLOCK = 67 TIME = 96.247 MACH 6.0 PT = 744.499 IT = 2965.5

XABS	P-IN	P-OUT	PDA	G0X	DAWALL	CAWALL
6.981400E-01	2.239999E 00	0.000000	-1.384897E-01	0.000000	2.470292E-02	2.470292E-02
3.070000E 01	2.239999E 00	0.000000	-2.556911E 02	0.000000	4.563589E 02	4.563589E 02
3.507999E 01	3.971813E 00	0.000000	-1.509192E 02	0.000000	1.751353E 02	6.315186E 02
3.517287E 01	3.978419E 00	5.677155E 00	-5.210352E 02	0.000000	4.092053E 00	6.356108E 02
3.517888E 01	3.978844E 00	5.654320E 00	-5.210908E 02	0.000000	2.656013E-01	6.356762E 02
3.554999E 01	4.004999E 00	4.284919E 00	-5.285134E 02	0.000000	3.720087E 01	6.730769E 02
3.584488E 01	3.993435E 00	3.125000E 00	-5.399446E 02	-2.362649E 02	2.997562E 01	7.030525E 02
3.606000E 01	3.984999E 00	3.988297E 00	-5.49627E 02	-2.665173E 02	2.203047E 01	7.250830E 02
3.648000E 01	4.196873E 00	7.699977E 00	-5.633944E 02	-2.730471E 02	4.375017E 01	7.688330E 02
3.698888E 01	4.288430E 00	7.699977E 00	-5.826018E 02	-2.860366E 02	5.330325E 01	8.221362E 02
3.702999E 01	4.230000E 00	7.688264E 00	-5.830876E 02	-2.865802E 02	2.484087E 00	8.246208E 02
3.730489E 01	4.251682E 00	7.524996E 00	-5.933680E 02	-2.930625E 02	3.178139E 01	8.564021E 02
3.783488E 01	4.290652E 00	1.155000E 01	-6.122344E 02	-3.050104E 02	5.764955E 01	9.140515E 02
3.803000E 01	4.304999E 00	1.153340E 01	-6.151196E 02	-3.095315E 02	2.153172E 01	9.358833E 02
3.832489E 01	5.324603E 00	1.150632E 01	-6.19729E 02	-3.167090E 02	3.285728E 01	9.684404E 02
3.875000E 01	6.806656E 00	1.425946E 01	-6.292708E 02	-3.281145E 02	4.912251E 01	1.016563E 03
3.879489E 01	6.826311E 00	1.454999E 01	-6.252969E 02	-3.293948E 02	5.129356E 00	1.021692E 03
3.900999E 01	7.709999E 00	1.516682E 01	-6.233680E 02	-3.357500E 02	2.336586E 01	1.086070E 03
3.930489E 01	1.326318E 01	1.601248E 01	-6.273564E 02	-3.450815E 02	3.402908E 01	1.080107E 03
3.950000E 01	1.693748E 01	1.447437E 01	-6.350857E 02	-3.516042E 02	2.262947E 01	1.102736E 03
3.974899E 01	1.756500E 01	1.215000E 01	-6.498362E 02	-3.622666E 02	3.427789E 01	1.137014E 03
4.000000E 01	1.900310E 01	8.496008E 00	-6.632449E 02	-3.70131E 02	2.400969E 01	1.161023E 03
4.029489E 01	1.648218E 01	3.149999E 00	-6.688044E 02	-3.820108E 02	3.459203E 01	1.195616E 03
4.039999E 01	1.661228E 01	3.030502E 00	-6.993021E 02	-3.866514E 02	1.230928E 01	1.207925E 03
4.040999E 01	1.662747E 01	3.019135E 00	-7.002312E 02	-3.869503E 02	1.180970E 00	1.209106E 03
4.128987E 01	1.596745E 01	2.018890E 00	-7.859751E 02	-4.422595E 02	1.040585E 02	1.311165E 03
4.135489E 01	2.006648E 01	1.844998E 00	-7.921902E 02	-4.476179E 02	7.734809E 00	1.320899E 03
4.150000E 01	2.028448E 01	2.523438E 00	-8.058548E 02	-4.601909E 02	1.729069E 01	1.338190E 03
4.245999E 01	1.339999E 01	6.350159E 00	-8.617933E 02	-5.611052E 02	1.148974E 02	1.413087E 03
4.407489E 01	1.595278E 01	1.278749E 01	-8.873079E 02	-7.559434E 02	1.954355E 02	1.648522E 03
4.430988E 01	1.917888E 01	1.245824E 01	-8.898169E 02	-7.839094E 02	2.856598E 01	1.677088E 03
4.479987E 01	1.664024E 01	1.178410E 01	-8.942751E 02	-8.303518E 02	5.658730E 01	1.735675E 03
4.479999E 01	1.664995E 01	1.177200E 01	-8.964546E 02	-8.394607E 02	1.224305E 00	1.736899E 03
4.625999E 01	1.340663E 01	9.727325E 00	-9.031030E 02	-9.092536E 02	1.794045E 02	1.916304E 03
4.731000E 01	1.451249E 01	8.256821E 00	-8.992581E 02	-1.092805E 03	1.302068E 02	2.046510E 03
4.731488E 01	1.488622E 01	8.249995E 00	-8.992686E 02	-1.093314E 03	5.326196E-01	2.047043E 03
4.810999E 01	1.053749E 01	9.302671E 00	-8.833652E 02	-1.167409E 03	9.915115E 01	2.146194E 03
4.876488E 01	1.027913E 01	1.027913E 01	-8.530300E 02	-1.225034E 03	8.195098E 01	2.228145E 03
4.939489E 01	1.102082E 01	1.102082E 01	-8.233074E 02	-1.269386E 03	6.648273E 01	2.294627E 03
5.070488E 01	5.051246E 00	5.031246E 00	-7.642705E 02	-1.373120E 03	1.775520E 02	2.472179E 03
5.280489E 01	5.924999E 00	5.924999E 00	-7.039539E 02	-1.501124E 03	2.662993E 02	2.738478E 03
5.330489E 01	5.12499E 00	5.712494E 00	-6.888274E 02	-1.528817E 03	6.372684E 01	2.802205E 03
5.405489E 01	5.147507E 00	5.147507E 00	-6.678154E 02	-1.568833E 03	9.562253E 01	2.896028E 03
5.451999E 01	4.797134E 00	4.797134E 00	-6.559893E 02	-1.591373E 03	5.955913E 01	2.957587E 03
5.471488E 01	4.574997E 00	4.574997E 00	-6.486995E 02	-1.605398E 03	3.781799E 01	2.995405E 03
5.575999E 01	3.715805E 00	3.715805E 00	-6.293296E 02	-1.647299E 03	1.214799E 02	3.110884E 03
5.623988E 01	3.279541E 00	3.279541E 00	-6.004400E 02	-1.666055E 03	4.361539E 01	3.160500E 03
5.643489E 01	1.662499E 00	3.229538E 00	-5.994812E 02	-1.668043E 03	7.045183E 00	3.167545E 03
5.651488E 01	1.662499E 00	3.102264E 00	-5.973948E 02	-1.673044E 03	3.361539E 01	3.185317E 03
5.679489E 01	2.774999E 00	3.025556E 00	-5.961472E 02	-1.675807E 03	1.023519E 01	3.195552E 03
5.702089E 01	2.676865E 00	2.774999E 00	-5.923779E 02	-1.685552E 03	3.567197E 01	3.231224E 03
5.774489E 01	2.362497E 00	2.362497E 00	-5.897261E 02	-1.693143E 03	2.883450E 01	3.260058E 03
5.876488E 01	3.224999E 00	3.224999E 00	-5.826243E 02	-1.716414E 03	9.262752E 01	3.352686E 03
6.077489E 01	2.499999E 00	2.499999E 00	-5.764243E 02	-1.747761E 03	1.307153E 02	3.483401E 03
			-5.757563E 02	-1.801277E 03	2.578855E 02	3.741286E 03

READING = 0038 BLOCK = 01 TIME = 96.247 MACH 6.0 PI = 744.499 IT = 2905.5

XAB8	P-IN	P-OUT	PDA	BOX	DAWALL	CAWALL
6.219489E 01	1.037499E 00	1.637499E 00	-5.757563E 02	-1.834097E 03	1.821803E 02	3.923477E 03
6.465889E 01	3.747498E 00	3.747498E 00	-5.757563E 02	-1.895801E 03	3.461137E 02	4.239613E 03
6.503488E 01	4.499999E 00	4.069473E 00	-5.757563E 02	-1.905856E 03	4.824060E 01	4.287852E 03
6.507489E 01	4.999999E 00	4.103729E 00	-5.757563E 02	-1.906924E 03	5.134232E 00	4.292984E 03
6.527489E 01	4.357880E 00	4.274994E 00	-5.757563E 02	-1.912177E 03	2.565889E 01	4.318641E 03
6.693489E 01	3.178266E 00	2.269999E 00	-5.372124E 02	-1.946301E 03	2.159020E 02	4.534534E 03
6.760889E 01	2.702164E 00	2.692498E 00	-4.823037E 02	-1.955872E 03	8.175694E 01	4.616293E 03
6.837088E 01	2.154999E 00	2.412155E 00	-4.131448E 02	-1.966094E 03	9.480736E 01	4.711098E 03
6.909488E 01	1.708374E 00	2.149999E 00	-3.586211E 02	-1.976366E 03	8.790805E 01	4.799004E 03
6.970488E 01	1.299999E 00	1.351730E 00	-3.230972E 02	-1.985350E 03	7.402164E 01	4.873023E 03
6.990488E 01	1.275635E 00	1.049999E 00	-3.141306E 02	-1.988200E 03	2.417422E 01	4.897199E 03
7.065488E 01	1.071838E 00	1.529999E 00	-2.831807E 02	-1.998973E 03	9.022328E 01	4.987122E 03
7.108488E 01	9.549999E-01	1.457600E 00	-2.657383E 02	-2.004596E 03	5.202614E 01	5.039445E 03
7.261488E 01	1.121483E 00	1.199999E 00	-2.097466E 02	-2.018464E 03	1.842812E 02	5.223723E 03
7.276488E 01	1.139999E 00	1.108337E 00	-2.047488E 02	-2.019453E 03	1.724117E 01	5.240961E 03
7.351488E 01	1.082307E 00	6.499999E-01	-1.711668E 02	-2.025559E 03	8.493413E 01	5.325492E 03
7.351984E 01	1.082000E 00	6.475525E-01	-1.708380E 02	-2.025598E 03	1.620043E-01	5.325652E 03
7.484488E 01	9.799999E-01	0.000000	-1.489182E 02	-2.038073E 03	5.187865E 01	5.377527E 03
7.769489E 01	4.749999E-01	0.000000	-1.198262E 02	-2.027854E 03	9.820615E 01	5.475730E 03
8.159488E 01	8.399999E-01	0.000000	-8.044013E 01	-2.013032E 03	1.049649E 02	5.580691E 03
8.440488E 01	4.750000E-01	0.000000	-7.583203E 01	-1.992921E 03	5.457251E 01	5.635262E 03
8.726488E 01	9.449989E-01	0.000000	-5.942314E 01	-1.934330E 03	2.868561E 01	5.657945E 03
8.727089E 01	9.461126E-01	0.000000	-5.941748E 01	-1.934238E 03	0.000000	5.657945E 03

READING = 0038 BLOCK = 07 TIME = 90.247 MAM 6.0 PT = 744.499 IT = 2405.5

X	CDRAG	CF	HC
4.03999E 01	1.242640E 02	2.324795E-03	4.600513E-02
4.04099E 01	1.242640E 02	2.330866E-03	4.602779E-02
4.12698E 01	1.399443E 02	2.472538E-03	4.877032E-02
4.13508E 01	1.411097E 02	2.436123E-03	4.897771E-02
4.15000E 01	1.436682E 02	2.450689E-03	4.937379E-02
4.24599E 01	1.605567E 02	2.507865E-03	5.041008E-02
4.40748E 01	1.883675E 02	2.543621E-03	4.958024E-02
4.43098E 01	1.923379E 02	2.548927E-03	4.957194E-02
4.47898E 01	2.004425E 02	2.560851E-03	4.961142E-02
4.47999E 01	2.006114E 02	2.561081E-03	4.962087E-02
4.62599E 01	2.245774E 02	2.582984E-03	4.714710E-02
4.73100E 01	2.408029E 02	2.587163E-03	4.393935E-02
4.73148E 01	2.408668E 02	2.587209E-03	4.392762E-02
4.81099E 01	2.523650E 02	2.578930E-03	4.074025E-02
4.87688E 01	2.612026E 02	2.554021E-03	3.707847E-02
4.92948E 01	2.678857E 02	2.521251E-03	3.420863E-02
5.07088E 01	2.839270E 02	2.478069E-03	2.835528E-02
5.26048E 01	3.041436E 02	2.424832E-03	2.255140E-02
5.33048E 01	3.084207E 02	2.410310E-03	2.145397E-02
5.40588E 01	3.115826E 02	2.390497E-03	1.999439E-02
5.45199E 01	3.16249E 02	2.379394E-03	1.918920E-02
5.48148E 01	3.204006E 02	2.372655E-03	1.871420E-02
5.57599E 01	3.272896E 02	2.355020E-03	1.873020E-02
5.62398E 01	3.294463E 02	2.316546E-03	1.371508E-02
5.62948E 01	3.297563E 02	2.315693E-03	1.368765E-02
5.65348E 01	3.303349E 02	2.313967E-03	1.352455E-02
5.65148E 01	3.309034E 02	2.307474E-03	1.365839E-02
5.67948E 01	3.325503E 02	2.300621E-03	1.357404E-02
5.70209E 01	3.336118E 02	2.299949E-03	1.350948E-02
5.77448E 01	3.378208E 02	2.287484E-03	1.322953E-02
5.87648E 01	3.433999E 02	2.278591E-03	1.308775E-02
6.07748E 01	3.545139E 02	2.273390E-03	1.352465E-02
6.21948E 01	3.625667E 02	2.273390E-03	1.388088E-02
6.72708E 01	3.763618E 02	2.293292E-03	1.328583E-02
6.46508E 01	3.913501E 02	2.262241E-03	1.109564E-02
6.50348E 01	3.932354E 02	2.265227E-03	1.224298E-02
6.52748E 01	3.934441E 02	2.265605E-03	1.227875E-02
6.52748E 01	3.944893E 02	2.265845E-03	1.230078E-02
6.69348E 01	4.022053E 02	2.178844E-03	8.712038E-03
6.76048E 01	4.047205E 02	2.175848E-03	8.641709E-03
6.83748E 01	4.074797E 02	2.143436E-03	7.608750E-03
6.90948E 01	4.097766E 02	2.110422E-03	6.685097E-03
6.97048E 01	4.114077E 02	2.045294E-03	5.061820E-03
6.99048E 01	4.118584E 02	2.023295E-03	4.597530E-03
7.06548E 01	4.135220E 02	2.037928E-03	4.93072E-03
7.10848E 01	4.144871E 02	2.024591E-03	4.661053E-03
7.26148E 01	4.177747E 02	2.015279E-03	4.520560E-03
7.27648E 01	4.180747E 02	2.009036E-03	4.408840E-03
7.35148E 01	4.194084E 02	1.962216E-03	3.602821E-03
7.35188E 01	4.194106E 02	1.961510E-03	3.598487E-03
7.48448E 01	4.201808E 02	1.977901E-03	3.950581E-03
7.76948E 01	4.214055E 02	1.868814E-03	2.254580E-03
8.15948E 01	4.226550E 02	1.940082E-03	3.654052E-03
8.44048E 01	4.232761E 02	1.805880E-03	2.007489E-03
8.72648E 01	4.235383E 02	1.930461E-03	3.757572E-03
8.72708E 01	4.235383E 02	1.930461E-03	3.760948E-03
8.72708E 01	4.235383E 02	1.930461E-03	3.760948E-03



# WAVJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST.....-175. (LBF)  
 MEASURED THRUST.....-59. (LBF)  
 CALCULATED SPECIFIC IMPULSE.....-175. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE.....-59. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT.....-1.191  
 MEASURED THRUST COEFFICIENT.....-0.238

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED  
 STREAM THRUST.....0. (LBF)  
 NET THRUST.....0. (LBF)  
 SPECIFIC IMPULSE.....0. (LBF-SEC/LBM)  
 THRUST COEFFICIENT.....0.0000

## INLET

ANGLE OF ATTACK.....0.000 (DEGREES)  
 MASS FLOW RATIO.....0.9885  
 ADDITIVE DRAG COEFFICIENT.....0.0000  
 LIMITING PRESSURE RECOVERY EFFICIENCY.....0.1563  
 DELTA PT2.....0.1216 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC.....0.3172  
 TOTAL PRESSURE RECOVERY = SUBSONIC.....0.1587  
 INLET PROCESS EFFICIENCY = SUPERSONIC.....0.8803  
 INLET PROCESS EFFICIENCY = SUBSONIC.....0.9022  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC.....0.9292  
 KINETIC ENERGY EFFICIENCY = SUBSONIC.....0.8879  
 ENTHALPY AT PU = SUPERSONIC.....1.67 (BTU/LBM)  
 ENTHALPY AT PU = SUBSONIC.....30.21 (BTU/LBM)

## MOMENTUM AND FORCES

INLET FRICTION DRAG.....124.3 (LBF)  
 INLET MOMENTUM CHANGE.....-823.6 (LBF)  
 COMBUSTOR FRICTION DRAG.....235.3 (LBF)  
 COMBUSTOR STRUT DRAG.....5.14 (LBF)  
 COMBUSTOR MOMENTUM CHANGE.....-120. (LBF)  
 NOZZLE FRICTION DRAG.....45.19 (LBF)  
 NOZZLE STRUT DRAG.....2.34 (LBF)  
 NOZZLE MOMENTUM CHANGE.....469. (LBF)  
 NOZZLE PRESSURE INTEGRAL.....516. (LBF)  
 EXTERNAL FRICTION DRAG.....58.71 (LBF)  
 EXTERNAL PRESSURE INTEGRAL.....-1023. (LBF)  
 TOTAL EXTERNAL DRAG.....-1091. (LBF)  
 TOTAL STRUT DRAG.....7.68 (LBF)  
 CAVITY FORCE.....-1305. (LBF)  
 CALCULATED LOAD CELL FORCE.....-2921. (LBF)  
 MEASURED LOAD CELL FORCE.....-2505. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## COMBUSTOR

FUEL-AIR RATIO.....0.0000  
 EQUIVALENCE RATIO.....0.000  
 COMBUSTOR EFFICIENCY.....0.000  
 TOTAL PRESSURE RATIO.....0.3165  
 COMBUSTOR EFFECTIVENESS.....0.7600  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8.....0.9904  
 NOZZLE COEFFICIENT = C7.....0.9489  
 PROCESS EFFICIENCY.....0.9389  
 KINETIC ENERGY EFFICIENCY.....0.9798

## STATIONS

NOMINAL COWL LEADING EDGE.....34.884 (IN)  
 SPIKE TRANSLATION.....0.2949 (IN)  
 INLET THROAT.....40.400 (IN)  
 COWL LEADING EDGE.....35.174 (IN)  
 NOZZLE SHROUD TRAILING EDGE.....73.314 (IN)  
 NOZZLE PLUG TRAILING EDGE.....87.271 (IN)  
 STRUT LEADING EDGE.....56.435 (IN)  
 STRUT TRAILING EDGE.....65.035 (IN)  
 COMBUSTOR EXIT.....62.195 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.280	
1C	44.300	
2A	48.755	
2C	46.250	
3A	54.045	
3B	56.230	
4	44.780	

Reading 38

$t = 107.05 \text{ sec.}$

h6/52/21

8 U M M A R Y H E P U T

P	T	M	GAPPA	MOLE	SHRY	WEL	W	A/C	W	WEL	WEL
140 TUNNEL	1	5									
0.000	745.749	2968	665.76	7913	1.2930	26.972	2575				
0.000	0.367	405	-31.86	973	1.3989	26.971	966	5.994	5908	1.626	0.10596
SPRKE TIP	2	0	0	0							5008
0.000	18.050	2968	665.76	7913	1.2929	26.971	2575				
0.000	18.319	2920	645.26	7713	1.2951	26.971	2568	0.397	1011	2.081	0.10596
WIND TUNNEL	3	0	0	0							4959
0.000	745.749	2968	665.76	7913	1.2930	26.972	2575				
0.000	0.360	405	-32.86	973	1.3989	26.971	965	6.011	5910	1.626	0.10468
SPRKE TIP	4	0	0	0							4949
0.000	18.050	2968	665.76	7913	1.2929	26.971	2575				
0.000	18.366	2922	645.26	7713	1.2950	26.971	2566	0.391	997	2.081	0.10468
INLET THROAT	5	0	0	0							4949
40.800	283.561	2934	649.36	7753	1.2948	26.972	2553				
40.800	15.952	1452	229.06	3503	1.3505	26.971	1835	2.498	4580	1.087	0.09301
INLET UPWASH	6	0	0	0							4262
40.800	283.561	2934	649.36	7753	1.2948	26.972	2553				
40.800	13.911	1396	219.36	3473	1.3534	26.971	1801	2.590	4604	1.087	0.09274
INLET DOWNWASH	7	0	0	0							4304
40.800	121.917	2934	649.36	7753	1.2948	26.972	2553				
40.800	104.563	2933	619.06	7453	1.2960	26.972	2512	0.490	1232	1.945	0.09274
COMBUSTOR	8	1	21	652.06	8083	1.2964	27.111	2617			
40.810	220.512	2876	652.06	8083	1.2964	27.111	2617				
40.810	12.993	1434	219.36	3473	1.3534	27.111	1807	2.468	4656	2.006	0.09293
COMBUSTOR	9	2	21	657.06	8203	1.3041	25.378	2663			
41.302	160.769	2775	657.06	8203	1.3041	25.378	2663				
41.302	14.326	1523	257.06	8293	1.3509	25.378	2008	2.327	4471	2.124	0.09503
COMBUSTOR	10	3	21	657.36	8083	1.3070	25.314	2638			
41.312	173.931	2711	657.36	8083	1.3070	25.314	2638				
41.312	14.339	1453	258.16	8493	1.3552	25.314	1967	2.372	4469	2.111	0.09509
COMBUSTOR	11	4	21	657.16	8083	1.3075	25.305	2634			
41.377	173.438	2701	657.16	8083	1.3075	25.305	2634				
41.377	14.222	1449	260.06	8493	1.3555	25.305	1965	2.269	4457	2.110	0.09502
COMBUSTOR	12	5	21	656.06	8023	1.3076	25.304	2633			

ORIGINAL PAGE IS  
OF POOR QUALITY

PAGE 2

HEADING = U038 FLUCK = 74 TIME = 107.000 CALM 0.0 D1 = 745.149 I1 = 242.1

P	T	P	GAMMA	DELTA	SUNV	WIND	S	W/A	M	M/AC	W	VAL	PMI	ELAC
COMBUSTOR	0	14	12	21										
46.260	116.099	2784	635.1	( 828)	1.3027	25.480	2601							
46.260	17.021	1761	303.4	( 500)	1.5389	25.480	2146	1.843	4062	2.149	0.05214	27.035	0.1239	3972 53.792 146.4 0.33 0.09
COMBUSTOR	0	20	13	21										
47.310	123.407	2636	626.3	( 781)	1.3093	25.327	2603							
47.310	14.388	1547	282.3	( 437)	1.3502	25.326	2025	2.055	4161	2.120	0.79288	27.035	0.1331	3987 51.269 147.5 0.33 0.01
COMBUSTOR	0	21	14	21										
47.337	125.699	2616	626.2	( 775)	1.3102	25.307	2595							
47.337	14.269	1523	281.6	( 430)	1.3516	25.307	2011	2.071	4165	2.125	0.79176	27.035	0.1333	3987 51.243 147.5 0.33 0.00
COMBUSTOR	0	22	15	21										
48.110	121.095	2603	624.8	( 771)	1.3107	25.304	2589							
48.110	12.051	1488	272.1	( 419)	1.3535	25.304	1989	2.112	4201	2.126	0.73880	27.035	0.1429	4001 48.239 148.0 0.33 0.00
COMBUSTOR	0	23	16	21										
48.787	118.722	2594	622.2	( 768)	1.3110	25.303	2585							
48.787	12.084	1467	265.8	( 413)	1.3546	25.303	1976	2.137	4223	2.126	0.67922	27.035	0.1554	4030 44.578 149.1 0.33 0.00
COMBUSTOR	0	24	17	21										
49.317	100.313	2742	620.4	( 814)	1.3041	25.455	2643							
49.317	11.992	1629	264.6	( 480)	1.3449	25.455	2088	2.040	4220	2.155	0.63523	27.035	0.1662	4034 41.655 150.0 0.33 0.09
COMBUSTOR	0	25	18	21										
50.727	100.749	2599	616.2	( 769)	1.3105	25.326	2586							
50.727	8.612	1584	233.8	( 388)	1.3589	25.326	1922	2.276	4374	2.134	0.54139	27.035	0.1950	4116 36.803 152.2 0.33 0.01
COMBUSTOR	0	26	19	21										
52.827	106.666	2563	610.8	( 758)	1.3120	25.307	2570							
52.827	7.012	1289	212.0	( 360)	1.3644	25.306	1859	2.403	4467	2.131	0.44373	27.035	0.2379	4181 30.807 154.7 0.33 0.00
COMBUSTOR	0	27	20	21										
53.327	105.121	2557	609.7	( 756)	1.3122	25.304	2568							
53.327	6.167	1247	200.5	( 348)	1.3668	25.304	1830	2.473	4525	2.131	0.42560	27.035	0.2480	4194 29.928 155.1 0.33 0.00
COMBUSTOR	0	28	21	21										
54.077	101.877	2552	608.1	( 754)	1.3124	25.303	2565							
54.077	5.227	1200	186.9	( 334)	1.3695	25.303	1797	2.555	4591	2.133	0.40118	27.035	0.2631	4210 28.621 155.7 0.33 0.00
COMBUSTOR	0	29	22	21										
54.837	96.925	2547	606.7	( 752)	1.3125	25.303	2563							
54.837	4.275	1190	172.4	( 319)	1.3723	25.303	1761	2.648	4662	2.136	0.37938	27.035	0.2782	4222 27.448 156.2 0.33 0.00
COMBUSTOR	0	30	23	21										
55.760	89.758	2583	605.3	( 748)	1.3108	25.343	2577							
55.760	4.345	1199	173.6	( 333)	1.3692	25.343	1795	2.590	4647	2.146	0.35625	27.035	0.2963	4235 25.730 156.8 0.33 0.02
COMBUSTOR	0	31	24	21										
56.262	86.495	2547	604.7	( 752)	1.3124	25.309	2583							
56.262	4.383	1195	183.5	( 332)	1.3697	25.309	1793	2.561	4591	2.145	0.28687	27.035	0.3679	4271 20.468 158.0 0.33 0.00
COMBUSTOR	0	32	25	21										
56.317	82.558	2542	604.6	( 751)	1.3127	25.304	2560							
56.317	3.019	1090	154.8	( 302)	1.3757	25.304	1716	2.704	4744	2.148	0.28606	27.035	0.3690	4272 21.091 158.0 0.33 0.00
COMBUSTOR	0	33	26	21										
56.457	82.793	2541	604.5	( 750)	1.3127	25.303	2580							
56.457	3.024	1089	154.8	( 302)	1.3758	25.303	1716	2.765	4744	2.148	0.28401	27.035	0.3717	4274 20.437 158.1 0.33 0.00
COMBUSTOR	0	34	27	21										
56.537	78.291	2612	604.4	( 773)	1.3094	25.374	2589							
56.537	4.404	1265	182.6	( 352)	1.3651	25.374	1840	2.498	4594	2.160	0.28724	27.035	0.3675	4275 20.509 158.1 0.33 0.04
COMBUSTOR	0	35	28	21										
56.817	87.344	2550	604.1	( 753)	1.3123	25.314	2584							
56.817	4.425	1196	182.2	( 333)	1.3696	25.314	1793	2.562	4595	2.145	0.28624	27.035	0.3688	4279 20.440 158.3 0.33 0.01
COMBUSTOR	0	36	29	21										
57.043	84.332	2540	603.9	( 750)	1.3127	25.305	2560							
57.043	4.383	1180	180.6	( 328)	1.3706	25.305	1783	2.582	4603	2.142	0.28580	27.035	0.3693	4282 20.442 158.4 0.33 0.00
COMBUSTOR	0	37	30	21										
57.767	90.082	2537	603.2	( 749)	1.3129	25.303	2558							
57.767	4.250	1166	176.9	( 324)	1.3714	25.303	1772	2.606	4619	2.141	0.28127	27.035	0.3753	4290 20.190 158.7 0.33 0.00

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	P	T	H	GAPKA	MOUNT	SONV	MACH	VEL	S	W/A	A/AC	PUMP	Q	INST	PMI	ETAC
COMBUSTOR	0	30	31	21												
58.787	90.978	2534	602.3	(748)	1.5130	25.503	2457									
58.787	4.275	1103	170.1	(323)	1.5710	25.503	1770	2.609	4610	2.140	0.27007	21.035	0.3771	4294	20.057	150.0 0.35 0.00
COMBUSTOR	0	39	32	21												
60.797	55.006	2743	600.6	(814)	1.3033	25.517	2639									
60.797	2.500	1266	136.4	(351)	1.3618	25.517	1634	2.627	4819	2.200	0.28020	27.035	0.3850	4263	21.660	150.0 0.33 0.12
COMBUSTOR	0	40	33	21												
62.217	88.605	2557	599.4	(755)	1.3118	25.535	2566									
62.217	4.412	1194	170.6	(332)	1.3046	25.535	1791	2.573	4609	2.144	0.29704	27.035	0.3553	4275	21.277	150.1 0.33 0.02
COMBUSTOR	0	41	34	5												
64.681	49.495	3018	596.7	(900)	1.2902	25.611	2738									
64.681	7.923	1457	250.1	(387)	1.3273	25.612	2237	1.862	4165	2.230	0.28156	27.035	0.3709	4260	16.223	157.0 0.33 0.24
COMBUSTOR	0	42	35	3												
65.037	46.996	2985	596.2	(889)	1.2917	25.779	2727									
65.037	7.154	1910	245.6	(343)	1.3295	25.780	2213	1.893	4188	2.232	0.26176	27.035	0.4032	4258	17.036	157.5 0.33 0.27
COMBUSTOR	0	43	36	3												
65.037	46.996	3115	640.9	(933)	1.2872	25.778	2781									
65.037	7.487	2024	281.4	(378)	1.3251	25.780	2274	1.865	4242	2.207	0.26176	27.035	0.4032	4337	17.254	160.0 0.33 0.27
NOZZLE	44	37	4													
87.293	46.996	2985	596.2	(888)	1.2917	25.779	2727									
87.293	0.579	989	27.2	(270)	1.3776	25.780	1621	3.445	5585	2.232	0.05449	27.035	1.9371	4960	4.729	184.2 0.33 0.27
NOZZLE	45	38	4													
87.293	46.996	2985	596.2	(888)	1.2917	25.779	2727									
87.293	0.387	880	26.2	(241)	1.3831	25.780	1537	3.717	5713	2.232	0.04166	27.035	2.5336	5052	3.699	160.9 0.33 0.27
NOZZLE	46	39	4													
87.293	46.996	3115	640.9	(933)	1.2872	25.778	2781									
87.293	0.604	1055	28.6	(286)	1.3739	25.780	1672	3.411	5702	2.207	0.05449	27.035	1.9371	5091	4.828	180.3 0.33 0.27
NOZZLE	47	40	4													
87.293	46.996	3115	640.9	(933)	1.2872	25.778	2781									
87.293	0.367	934	42.9	(254)	1.3806	25.780	1577	3.710	5849	2.207	0.04047	27.035	2.6044	5170	5.679	191.4 0.33 0.27
FICTIVE COMBUSTOR	69	62	0													
65.037	283.561	4154	596.2	(1265)	1.2348	27.116	3067									
65.037	0.387	880	468.4	(231)	1.3746	27.150	1468	4.905	7299	2.157	0.05640	27.035	1.0716	6318	6.397	233.7 0.33 1.00
FICTIVE NOZZLE	70	63	0													
87.293	58.136	2968	590.4	(884)	1.2924	25.779	2720									
87.293	0.517	889	32.6	(245)	1.3825	25.780	1548	3.665	5672	2.214	0.05449	27.035	1.9371	5023	4.803	185.0 0.33 0.27

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XAB	P=18	P=06	PDA	W0X	W0R	G=0D	L=ALL	P=18/P10	P=06/P10	P=06/P10
6.080E 01	2.500E 00	2.500E 00	-3.482E 02	-2.043E 03	-1.040E 03	-1.003E 03	5.741E 03	3.352E+03	0.456E 00	3.352E+03
6.222E 01	4.412E 00	4.412E 00	-3.482E 02	-2.043E 03	-1.054E 03	-1.021E 03	5.942E 03	5.917E+03	1.140E 01	5.917E+03
6.468E 01	7.923E 00	7.923E 00	-3.482E 02	-2.149E 03	-1.000E 03	-1.064E 03	4.240E 03	1.002E+02	2.006E 01	1.002E+02
6.500E 01	8.450E 00	8.450E 00	-3.482E 02	-2.149E 03	-1.084E 03	-1.078E 03	4.264E 03	7.644E+03	2.105E 01	1.134E+02
6.510E 01	8.550E 00	8.550E 00	-3.482E 02	-2.149E 03	-1.085E 03	-1.079E 03	4.293E 03	7.844E+03	2.200E 01	1.142E+02
6.530E 01	8.800E 00	8.800E 00	-3.482E 02	-2.149E 03	-1.087E 03	-1.084E 03	4.319E 03	7.992E+03	2.273E 01	1.180E+02
6.696E 01	6.870E 00	4.640E 00	-2.747E 02	-2.217E 03	-1.096E 03	-1.121E 03	4.535E 03	1.539E 01	1.775E 01	6.222E+03
6.763E 01	4.867E 00	3.765E 00	-1.726E 02	-2.229E 03	-1.096E 03	-1.133E 03	4.616E 03	1.575E 01	1.775E 01	6.222E+03
6.840E 01	2.565E 00	3.269E 00	-7.137E 01	-2.240E 03	-1.094E 03	-1.147E 03	4.711E 03	9.725E 00	8.444E 00	5.049E+03
6.912E 01	2.246E 00	2.803E 00	-1.201E 00	-2.251E 03	-1.091E 03	-1.161E 03	4.799E 03	3.011E+03	7.246E 00	3.761E+03
6.973E 01	1.975E 00	1.513E 00	4.546E 01	-2.261E 03	-1.088E 03	-1.173E 03	4.873E 03	5.102E 00	3.909E 00	2.029E+03
6.993E 01	1.819E 00	1.090E 00	5.708E 01	-2.255E 03	-1.088E 03	-1.177E 03	4.897E 03	4.752E 00	2.816E 00	1.462E+03
7.068E 01	1.331E 00	1.525E 00	9.402E 01	-2.278E 03	-1.085E 03	-1.193E 03	4.987E 03	3.439E 00	3.939E 00	2.045E+03
7.111E 01	1.040E 00	1.475E 00	1.129E 02	-2.255E 03	-1.084E 03	-1.201E 03	5.040E 03	2.686E 00	3.604E 00	1.977E+03
7.264E 01	1.140E 00	1.295E 00	1.714E 02	-2.306E 03	-1.080E 03	-1.226E 03	5.224E 03	2.945E 00	3.445E 00	1.737E+03
7.279E 01	1.150E 00	3.667E 00	1.789E 02	-2.306E 03	-1.079E 03	-1.226E 03	5.241E 03	2.971E 00	3.445E 00	1.737E+03
7.335E 01	1.107E 00	1.252E 01	2.506E 02	-2.310E 03	-1.078E 03	-1.238E 03	5.307E 03	2.659E 00	3.235E 01	1.680E+02
7.354E 01	1.092E 00	6.550E-01	3.448E 02	-2.319E 03	-1.078E 03	-1.241E 03	5.334E 03	2.622E 00	1.692E 00	8.783E+04
7.354E 01	1.092E 00	4.023E-01	3.459E 02	-2.319E 03	-1.078E 03	-1.241E 03	5.334E 03	2.622E 00	1.692E 00	8.783E+04
7.487E 01	9.900E-01	0.000	3.679E 02	-2.342E 03	-1.075E 03	-1.268E 03	5.386E 03	2.557E 00	1.328E+03	0.000
7.772E 01	4.500E-01	0.000	3.967E 02	-2.348E 03	-1.070E 03	-1.268E 03	5.484E 03	1.162E 00	0.000	0.000
8.162E 01	8.850E-01	0.000	4.252E 02	-2.333E 03	-1.066E 03	-1.268E 03	5.589E 03	2.286E 00	0.000	0.000
8.443E 01	2.630E-01	0.000	4.380E 02	-2.329E 03	-1.061E 03	-1.268E 03	5.643E 03	6.845E-01	0.000	0.000
8.729E 01	8.800E-01	0.000	4.518E 02	-2.320E 03	-1.052E 03	-1.268E 03	5.666E 03	2.273E 00	0.000	0.000
8.729E 01	8.813E-01	0.000	4.518E 02	-2.320E 03	-1.052E 03	-1.268E 03	5.666E 03	2.273E 00	0.000	0.000

X	UDRAG	CURAG	CF	HC
4.040E 01	1.323E 02	1.323E 02	2.226E-03	4.309E-02
4.041E 01	1.943E-01	1.323E 02	2.646E-03	3.542E-02
4.130E 01	1.931E 01	1.510E 02	2.810E-03	3.814E-02
4.131E 01	2.036E-01	1.520E 02	2.473E-03	4.186E-02
4.138E 01	1.249E 00	1.533E 02	2.420E-03	4.200E-02
4.150E 01	2.338E 00	1.556E 02	2.423E-03	4.356E-02
4.246E 01	1.798E 01	1.736E 02	2.487E-03	4.611E-02
4.410E 01	2.991E 01	2.033E 02	2.542E-03	4.842E-02
4.431E 01	3.803E 00	2.074E 02	2.650E-03	4.990E-02
4.480E 01	8.926E 00	2.163E 02	2.571E-03	4.798E-02
4.481E 01	2.112E-01	2.163E 02	2.558E-03	4.841E-02
4.554E 01	1.268E 01	2.292E 02	2.552E-03	5.062E-02
4.626E 01	1.229E 01	2.415E 02	2.525E-03	4.659E-02
4.731E 01	1.762E 01	2.591E 02	2.628E-03	3.859E-02
4.734E 01	4.456E-01	2.596E 02	2.517E-03	3.956E-02
4.811E 01	1.197E 01	2.716E 02	2.483E-03	3.653E-02
4.879E 01	9.700E 00	2.813E 02	2.453E-03	3.455E-02
4.932E 01	7.000E 00	2.803E 02	2.431E-03	3.401E-02
5.073E 01	1.718E 01	3.054E 02	2.503E-03	2.974E-02
5.203E 01	2.164E 01	3.271E 02	2.305E-03	2.191E-02
5.333E 01	4.421E 00	3.315E 02	2.264E-03	1.997E-02
5.408E 01	6.311E 00	3.378E 02	2.254E-03	1.758E-02
5.484E 01	6.081E 00	3.439E 02	2.216E-03	1.504E-02
5.576E 01	6.974E 00	3.509E 02	2.201E-03	1.507E-02
5.624E 01	3.302E 00	3.532E 02	2.217E-03	1.425E-02
5.632E 01	3.201E-01	3.535E 02	2.156E-03	1.097E-02
5.646E 01	6.037E-01	3.543E 02	2.147E-03	1.099E-02
5.654E 01	5.092E-01	3.548E 02	2.616E-03	1.281E-02
5.682E 01	1.771E 00	3.566E 02	2.234E-03	1.419E-02
5.704E 01	1.295E 00	3.579E 02	2.161E-03	1.434E-02
5.777E 01	4.043E 00	3.619E 02	2.136E-03	1.403E-02
5.872E 01	5.602E 00	3.675E 02	2.124E-03	1.407E-02
6.080E 01	1.134E 01	3.788E 02	2.091E-03	9.501E-03
6.222E 01	8.650E 00	3.875E 02	2.332E-03	1.359E-02
6.468E 01	1.444E 01	4.019E 02	2.294E-03	2.095E-02
6.506E 01	2.107E 00	4.040E 02	2.622E-03	1.732E-02
6.510E 01	2.330E-01	4.043E 02	2.681E-03	1.775E-02
6.530E 01	1.180E 00	4.055E 02	2.666E-03	1.806E-02
6.696E 01	9.475E 00	4.149E 02	2.640E-03	1.532E-02
6.763E 01	3.177E 00	4.181E 02	2.587E-03	1.257E-02
6.840E 01	3.100E 00	4.212E 02	2.514E-03	9.497E-03
6.912E 01	2.471E 00	4.237E 02	2.485E-03	8.534E-03
6.973E 01	1.792E 00	4.255E 02	2.415E-03	6.480E-03
6.993E 01	4.941E-01	4.260E 02	2.363E-03	5.883E-03
7.068E 01	1.729E 00	4.277E 02	2.375E-03	5.567E-03
7.111E 01	9.495E-01	4.286E 02	2.351E-03	5.055E-03
7.264E 01	3.142E 00	4.318E 02	2.342E-03	4.924E-03
7.279E 01	3.707E-01	4.322E 02	2.465E-03	8.196E-03
7.335E 01	2.299E 00	4.345E 02	2.655E-03	1.701E-02
7.354E 01	7.555E-01	4.353E 02	2.279E-03	3.622E-03
7.354E 01	2.120E-03	4.353E 02	2.252E-03	3.343E-03
7.407E 01	7.081E-01	4.360E 02	2.295E-03	4.191E-03
7.772E 01	1.151E 00	4.371E 02	2.147E-03	2.286E-03
8.162E 01	1.170E 00	4.385E 02	2.247E-03	3.749E-03
8.443E 01	5.263E-01	4.388E 02	2.035E-03	1.507E-03
8.729E 01	2.172E-01	4.390E 02	2.226E-03	3.745E-03



READING = 0030 BLUCK = 79 TIME = 107.047 MACM 6.0 PT = 145.144 TI = 2961.8  
X  
8.729E 01 0.000 4.590E 02 2.226E 03 3.749E 03

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0.034 BLOCK = 79 TIME = 107.007 MACH = 0.0 PT = 715.744 TS = 246.7

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 12. (LBF)  
 MEASURED THRUST..... 107. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 42. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 630. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.0050  
 MEASURED THRUST COEFFICIENT..... 0.0750

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 5135. (LBF)  
 NET THRUST..... 124. (LBF)  
 SPECIFIC IMPULSE..... 420. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.0499

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 132.3 (LBF)  
 INLET MOMENTUM CHANGE..... 740.6 (LBF)  
 COMBUSTOR FRICTION DRAG..... 271.7 (LBF)  
 COMBUSTOR STRUT DRAG..... 0.24 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 4. (LBF)  
 NOZZLE FRICTION DRAG..... 34.99 (LBF)  
 NOZZLE STRUT DRAG..... 5.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 705. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 200. (LBF)  
 EXTERNAL FRICTION DRAG..... 59.16 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... 907. (LBF)  
 TOTAL EXTERNAL DRAG..... 1026. (LBF)  
 TOTAL STRUT DRAG..... 0.24 (LBF)  
 CAVITY FORCE..... 1403. (LBF)  
 CALCULATED LOAD CELL FORCE..... 2416. (LBF)  
 MEASURED LOAD CELL FORCE..... 2242. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## STATIONS

NOMINAL CONVL LEADING EDGE..... 34.804 (IN)  
 SPIKE TRANSLATION..... 0.3168 (IN)  
 INLET THROAT..... 40.400 (IN)  
 CONVL LEADING EDGE..... 35.201 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.541 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 67.293 (IN)  
 STRUT LEADING EDGE..... 56.457 (IN)  
 STRUT TRAILING EDGE..... 65.057 (IN)  
 COMBUSTOR EXIT..... 65.057 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9834  
 ADDITIVE DRAG COEFFICIENT..... 0.0005  
 LIFTING PRESSURE RECOVERY EFFICIENCY..... 0.1612  
 DELTA P2..... 0.1179 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.1802  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.1635  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.8920  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.9046  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9304  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8875  
 ENTHALPY AT P0 = SUPERSONIC..... 3.76 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 30.34 (BTU/LBM)

## COMBUSTOR

FUEL/AIR RATIO..... 0.0110  
 EQUIVALENCE RATIO..... 0.348  
 COMBUSTION EFFICIENCY..... 0.272  
 TOTAL PRESSURE RATIO..... 0.1657  
 COMBUSTOR EFFECTIVENESS..... 0.3043  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = CS..... 1.0086  
 NOZZLE COEFFICIENT = CT..... 0.9562  
 PROCESS EFFICIENCY..... 1.0606  
 KINETIC ENERGY EFFICIENCY..... 1.0178

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.302	B
1C	40.300	
2A	48.777	
2C	46.250	
3A	50.067	
3B	56.252	
4	44.802	

ORIGINAL PAGE IS  
OF POOR QUALITY

Reading 38

$t = 113,35 \text{ sec.}$

The fuel valve for injector 2C failed open; therefore, data are for a transient rate of fuel flow.

READING = 0038 BLOCK = 60 TIME = 113.147 MACH 6.0 PT = 746.749 TT = 2977.4  
RAMJET PERFORMANCE

S U M M A R Y R E P O R T

	P	1	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MONTH	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	746.749	2977	662.6	1.2934	28.972	2571											
0.000	0.366	402	32.3	1.3988	28.971	963	5.999	3607	1.025	0.10606	26.798	0.9865	5009	9.719	186.9		
SPIKE TIP N8	2	0	4														
0.000	16.050	2977	662.5	1.2933	28.971	2571											
0.000	16.322	2910	662.2	1.2954	28.971	2543	0.397	1009	2.080	0.10606	26.798	0.9865	4964	1.662	183.2		
WIND TUNNEL	3	0	0														
0.000	746.749	2977	662.6	1.2934	28.972	2571											
0.000	0.360	401	32.7	1.3988	28.971	961	6.015	3698	1.025	0.10490	26.504	0.9865	4953	9.615	187.0		
SPIKE TIP N8	4	0	0														
0.000	16.050	2977	662.5	1.2933	28.971	2571											
0.000	16.365	2912	662.7	1.2954	28.972	2544	0.391	995	2.080	0.10490	26.504	0.9865	4955	1.623	187.0		
INLET THROAT	5	0	4														
40.400	241.277	2917	644.3	1.2953	28.972	2546											
40.400	17.471	1562	253.4	1.3455	28.971	1887	2.343	4422	1.896	0.93918	26.798	0.1114	4182	64.548	154.1		
INLET UPW8K	6	0	3														
40.400	241.277	2917	644.3	1.2953	28.972	2546											
40.400	14.956	1682	237.3	1.3488	28.971	1852	2.437	4513	1.896	0.85380	26.798	0.1225	4228	59.877	157.8		
INLET DNW8K	7	0	4														
40.400	119.024	2917	644.3	1.2953	28.972	2546											
40.400	101.129	2810	612.3	1.2987	28.972	2503	0.506	1265	1.943	0.85380	26.798	0.1225	4228	16.790	157.8		
COMBUSTOR	8	1	4														
40.410	240.766	2917	644.2	1.2953	28.972	2546											
40.410	17.491	1544	253.8	1.3455	28.971	1888	2.341	4420	1.896	0.93906	26.798	0.1110	4181	64.509	156.0		
COMBUSTOR	9	2	5														
41.308	201.336	2909	641.8	1.2956	28.972	2543											
41.308	19.754	1682	285.4	1.3395	28.972	1954	2.161	4223	1.908	0.94123	26.798	0.1112	4080	61.770	152.2		
COMBUSTOR	10	3	5														
41.373	199.190	2908	641.6	1.2956	28.972	2543											
41.373	19.937	1670	287.6	1.3391	28.972	1959	2.149	4209	1.908	0.94229	26.798	0.1110	4072	61.632	152.0		
COMBUSTOR	11	4	5														
41.500	194.815	2906	641.1	1.2956	28.972	2542											
41.500	20.266	1685	291.7	1.3384	28.972	1967	2.126	4182	1.910	0.94229	26.798	0.1110	4059	61.238	151.5		
COMBUSTOR	12	5	5														
42.400	173.458	2893	637.1	1.2961	28.972	2537											
42.400	21.609	1754	310.6	1.3352	28.971	2005	2.016	4042	1.916	0.93386	26.798	0.1121	3987	58.631	148.8		
COMBUSTOR	13	6	4														
44.093	157.778	2867	629.2	1.2969	28.972	2526											
44.093	21.651	1779	317.5	1.3342	28.971	2018	1.957	3949	1.920	0.90098	26.798	0.1161	3933	55.299	146.8		
COMBUSTOR	14	7	4														
44.310	156.675	2863	628.2	1.2970	28.972	2524											
44.310	21.691	1781	318.0	1.3341	28.971	2019	1.951	3940	1.920	0.89968	26.798	0.1163	3928	55.088	146.6		
COMBUSTOR	15	8	4														
44.600	154.140	2855	625.8	1.2972	28.972	2521											
44.600	21.757	1784	318.9	1.3340	28.971	2021	1.939	3919	1.921	0.89604	26.798	0.1168	3915	54.576	146.1		
COMBUSTOR	16	9	4														
44.808	154.008	2853	625.8	1.2973	28.972	2521											
44.808	21.752	1784	318.9	1.3340	28.971	2021	1.939	3919	1.921	0.89377	26.798	0.1168	3915	54.556	146.1		
COMBUSTOR	17	10	21														
46.250	102.762	2758	630.8	1.3036	25.689	2038											
46.250	14.500	1711	297.5	1.3410	25.689	2107	1.938	4084	2.139	0.85306	27.067	0.1239	3896	54.143	143.9	0.30	0.07
COMBUSTOR	18	11	21														
46.600	112.779	2657	630.8	1.3083	25.587	2599											
46.600	14.499	1601	297.5	1.3472	25.586	2047	1.995	4084	2.121	0.89259	27.067	0.1239	3896	54.111	143.9	0.30	0.01

READING = 0038 BLOCK = 80 TIME = 113.547 MACM 0.0 PT = 746.749 TI = 2977.4

P	T	H	GAMMA	MOLWT	80V	MACM	VEL	S	W/A	N	A/VAC	MOMTH	O	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	21												
47.310	110.809	2626	625.7	1.3095	25.571	2586										
47.310	14.416	1505	297.7	1.3481	25.571	2038	1.987	4051	2.119	0.79335	27.067	0.1332	3900	49.946	144.1	0.30 0.00
COMBUSTOR	0	20	13	21												
47.333	110.950	2623	625.5	1.3096	25.569	2585										
47.333	14.404	1503	297.6	1.3483	25.569	2037	1.989	4051	2.118	0.79303	27.067	0.1333	3899	49.923	144.1	0.30 0.00
COMBUSTOR	0	21	14	21												
48.110	108.001	2612	622.0	1.3100	25.569	2579										
48.110	13.722	1566	292.9	1.3491	25.568	2027	2.002	4058	2.119	0.73925	27.067	0.1430	3910	46.622	144.7	0.30 0.00
COMBUSTOR	0	22	15	21												
48.783	87.225	2603	619.3	1.3011	25.770	2653										
48.783	12.522	1751	243.5	1.3384	25.770	2126	1.928	4099	2.154	0.68801	27.067	0.1554	3947	43.318	143.8	0.30 0.12
COMBUSTOR	0	23	16	21												
49.313	101.082	2628	617.5	1.3091	25.599	2585										
49.313	12.287	1560	281.2	1.3491	25.598	2022	2.029	4102	2.126	0.63598	27.067	0.1662	3974	40.542	146.0	0.30 0.02
COMBUSTOR	0	24	17	21												
50.723	91.074	2589	613.1	1.3107	25.573	2569										
50.723	7.169	1169	232.8	1.3596	25.573	1902	2.294	4303	2.129	0.54203	27.067	0.1950	4028	36.749	148.0	0.30 0.00
COMBUSTOR	0	25	18	21												
52.023	86.635	2569	607.7	1.3114	25.569	2560										
52.023	6.225	1324	221.0	1.3621	25.569	1873	2.349	4399	2.131	0.44425	27.067	0.2379	4080	30.373	150.7	0.30 0.00
COMBUSTOR	0	26	19	21												
53.323	86.089	2565	606.6	1.3116	25.569	2558										
53.323	9.917	1356	229.7	1.3604	25.569	1892	2.295	4343	2.129	0.42610	27.067	0.2480	4093	28.758	151.2	0.30 0.00
COMBUSTOR	0	27	20	21												
54.073	84.668	2560	605.0	1.3117	25.569	2555										
54.073	5.642	1293	212.0	1.3639	25.568	1852	2.395	4435	2.131	0.40165	27.067	0.2631	4111	27.660	151.9	0.30 0.00
COMBUSTOR	0	28	21	21												
54.520	73.629	2625	604.1	1.3087	25.637	2581										
54.520	4.882	1330	200.8	1.3612	25.637	1874	2.357	4492	2.149	0.38846	27.067	0.2720	4119	27.520	152.2	0.30 0.04
COMBUSTOR	0	29	22	21												
54.833	77.576	2566	603.5	1.3114	25.579	2557										
54.833	4.350	1238	192.7	1.3620	25.579	1814	2.500	4534	2.139	0.37983	27.067	0.2782	4124	26.761	152.4	0.30 0.01
COMBUSTOR	0	30	23	21												
55.760	76.334	2552	601.9	1.3120	25.570	2552										
55.760	4.034	1211	187.7	1.3686	25.570	1795	2.536	4533	2.138	0.35658	27.067	0.2960	4136	25.228	152.8	0.30 0.00
COMBUSTOR	0	31	24	21												
56.258	69.414	2549	601.2	1.3121	25.569	2550										
56.258	3.864	1226	192.3	1.3677	25.569	1806	2.504	4522	2.145	0.28721	27.067	0.3679	4169	20.183	154.0	0.30 0.00
COMBUSTOR	0	32	25	21												
56.313	63.949	2548	601.1	1.3121	25.569	2550										
56.313	2.823	1151	171.0	1.3720	25.568	1753	2.647	4639	2.152	0.28640	27.067	0.3690	4169	20.647	154.0	0.30 0.00
COMBUSTOR	0	33	26	21												
56.453	45.440	2756	600.9	1.3025	25.778	2631										
56.453	2.799	1381	170.4	1.3570	25.778	1901	2.401	4641	2.199	0.28434	27.067	0.3717	4171	20.509	154.1	0.30 0.13
COMBUSTOR	0	34	27	21												
56.533	69.838	2547	600.8	1.3121	25.569	2549										
56.533	3.770	1215	189.4	1.3683	25.568	1798	2.523	4537	2.145	0.28752	27.067	0.3675	4172	20.274	154.1	0.30 0.00
COMBUSTOR	0	35	28	21												
56.813	52.864	2730	600.5	1.3037	25.754	2621										
56.813	3.675	1410	186.8	1.3554	25.754	1921	2.368	4530	2.185	0.28657	27.067	0.3688	4175	20.262	154.2	0.30 0.11
COMBUSTOR	0	36	29	21												
57.039	66.749	2573	600.2	1.3109	25.596	2560										
57.039	3.610	1230	185.0	1.3672	25.596	1808	2.522	4558	2.151	0.28603	27.067	0.3695	4176	20.263	154.3	0.30 0.02
COMBUSTOR	0	37	30	21												
57.763	68.650	2547	599.3	1.3121	25.573	2549										
57.763	3.400	1187	180.0	1.3699	25.573	1778	2.576	4581	2.146	0.28160	27.067	0.3753	4180	20.046	154.4	0.30 0.00

READING = 0038 BLOCK = 86 TIME = 113.747 MACH 6.0 PT = 746.749 TT = 2977.4

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/A/C	MONTH	U	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	21													
58.783	71.795	2540	598.1	1.3124	25.569	2546											
58.783	4.200	1237	195.7	1.3671	25.569	1814	2.474	4487	2.142	0.27980	27.067	0.3777	4181	19.513	154.5	0.30	0.00
COMBUSTOR	0	39	32	21													
60.795	64.368	2533	596.0	1.3126	25.569	2543											
60.795	2.625	1119	161.8	1.3739	25.569	1729	2.096	4661	2.149	0.28954	27.067	0.3650	4167	20.975	193.9	0.30	0.00
COMBUSTOR	0	40	33	21													
62.213	58.269	2529	594.8	1.3128	25.569	2541											
62.213	2.112	1082	151.2	1.3760	25.568	1701	2.769	4711	2.156	0.29739	27.067	0.3593	4154	21.774	193.5	0.30	0.00
COMBUSTOR	0	41	34	21													
64.677	64.118	2546	592.2	1.3118	25.593	2547											
64.677	3.042	1249	191.4	1.3662	25.593	1821	2.459	4479	2.131	0.28189	27.067	0.3749	4137	19.619	192.8	0.30	0.02
COMBUSTOR	0	42	35	21													
65.053	62.946	2523	591.8	1.3129	25.572	2538											
65.053	4.397	1288	209.5	1.3641	25.572	1819	2.366	4374	2.150	0.26206	27.067	0.4032	4134	17.814	192.7	0.30	0.00
COMBUSTOR	0	43	36	3													
65.053	62.946	2670	639.8	1.3081	25.572	2606											
65.053	5.131	1429	250.9	1.3562	25.572	1941	2.272	4412	2.148	0.26206	27.067	0.4032	4241	17.967	196.7	0.30	0.00
NOZZLE	AE	44	37	3													
87.289	62.946	2523	591.8	1.3129	25.572	2538											
87.289	0.421	673	36.1	1.3956	25.572	1351	3.902	5273	2.130	0.05455	27.067	1.9371	4645	4.471	171.6	0.30	0.00
NOZZLE	PO	45	38	3													
87.289	62.946	2523	591.8	1.3129	25.572	2538											
87.289	0.386	657	31.7	1.3962	25.572	1335	3.965	5294	2.130	0.05149	27.067	2.0522	4697	4.237	172.1	0.30	0.00
NOZZLE	AE	46	39	3													
87.289	62.946	2670	639.8	1.3081	25.572	2606											
87.289	0.443	731	32.1	1.3935	25.572	1408	3.893	5423	2.168	0.05455	27.067	1.9371	4783	4.598	176.7	0.30	0.00
NOZZLE	PO	47	40	3													
87.289	62.946	2670	639.8	1.3081	25.572	2606											
87.289	0.386	703	44.2	1.3946	25.572	1380	3.955	5059	2.168	0.04964	27.067	2.1290	4803	4.211	177.5	0.30	0.00
FICTIVE COMBUSTOR	68	61	0														
65.053	241.277	4047	591.8	1.2396	27.264	3025											
65.053	0.366	881	422.8	1.3745	27.291	1485	4.797	7126	2.146	0.05513	27.067	1.9167	6184	6.105	228.5	0.30	1.00
FICTIVE NOZZLE	69	62	0														
87.289	72.715	2520	590.7	1.3130	25.572	2536											
87.289	0.392	632	24.0	1.3969	25.572	1310	4.061	5321	2.138	0.05455	27.067	1.9371	4671	4.511	172.6	0.30	0.00

READING = 0030 BLOCK = 86 TIME = 113.347 MACH 6.0 PT = 740.749 TT = 2977.4

XABS	P-IN	P-OUT	PDA	GDX	DAWALL	CANALL
6.981400E-01	2.249999E-00	0.000000	-4.397774E-01	0.000000	2.470292E-02	2.470292E-02
3.070000E-01	2.249999E-00	0.000000	-2.508318E-02	0.000000	4.563589E-02	4.563589E-02
3.507999E-01	3.983124E-00	0.000000	-4.588080E-02	0.000000	1.751133E-02	6.315186E-02
3.519083E-01	3.981032E-00	5.670066E-00	-5.240673E-02	0.000000	4.885509E-00	6.316404E-02
3.519084E-01	3.981103E-00	5.670066E-00	-5.240673E-02	0.000000	2.658079E-01	6.316669E-02
3.554999E-01	3.974986E-00	4.319748E-00	-5.314430E-02	0.000000	3.540533E-01	6.720752E-02
3.586828E-01	3.968833E-00	3.999998E-00	-5.432933E-02	3.370596E-02	3.179939E-01	7.018745E-02
3.606000E-01	3.964999E-00	3.904205E-00	-5.516653E-02	0.000000	2.020746E-01	7.240816E-02
3.640000E-01	4.200063E-00	5.617355E-00	-5.605742E-02	3.408713E-02	4.361250E-01	7.676941E-02
3.700284E-01	4.214832E-00	7.749998E-00	-5.858394E-02	0.000000	5.531558E-01	8.230095E-02
3.700999E-01	4.214999E-00	7.745789E-00	-5.87012E-02	3.657061E-02	5.663199E-01	8.235737E-02
3.732855E-01	4.271741E-00	7.562497E-00	-5.971487E-02	3.659310E-02	5.371132E-01	8.572886E-02
3.785284E-01	4.329999E-00	1.162500E-01	-6.156075E-02	3.895574E-02	5.767563E-01	9.149644E-02
3.803000E-01	4.339999E-00	1.152535E-01	-6.164812E-02	3.947207E-02	1.956216E-01	9.345264E-02
3.834285E-01	5.523712E-00	1.134999E-01	-6.243181E-02	4.042947E-02	3.490491E-01	9.694312E-02
3.881285E-01	6.986145E-00	1.407860E-01	-6.308384E-02	4.17688E-02	4.606038E-01	1.015497E-03
3.900999E-01	7.919998E-00	1.449999E-01	-6.310847E-02	4.202078E-02	7.180240E-00	1.022677E-03
3.932285E-01	1.37179E-01	1.507749E-01	-6.347564E-02	4.397856E-02	5.233218E-01	1.045010E-03
3.950000E-01	1.49908E-01	1.566280E-01	-6.416447E-02	4.471985E-02	2.056076E-01	1.101662E-03
3.981285E-01	1.679058E-01	1.222500E-01	-6.574070E-02	4.611204E-02	3.643562E-01	1.138092E-03
4.000000E-01	1.807152E-01	8.828125E-00	-6.691060E-02	4.69822E-02	2.184712E-01	1.159944E-03
4.032285E-01	1.838936E-01	3.149998E-00	-6.930643E-02	4.855159E-02	3.665237E-01	1.196596E-03
4.039999E-01	1.847209E-01	3.050934E-00	-7.047913E-02	4.890564E-02	1.02430E-01	1.206840E-03
4.040999E-01	1.848271E-01	3.039566E-00	-7.056511E-02	4.905911E-02	1.182496E-00	1.208022E-03
4.130783E-01	1.938252E-01	2.018906E-00	-7.909746E-02	5.55369E-02	1.061805E-02	1.314203E-03
4.137285E-01	1.944968E-01	1.944968E-00	-7.969774E-02	5.613438E-02	7.73647E-02	1.321492E-03
4.150000E-01	1.957498E-01	2.456605E-00	-8.03572E-02	5.73286E-02	1.518441E-01	1.337123E-03
4.249999E-01	1.454999E-01	6.319776E-00	-8.635403E-02	6.82686E-02	1.148034E-02	1.45197E-03
4.409285E-01	1.575359E-01	1.289061E-01	-8.85524E-02	6.924976E-02	1.976047E-02	1.640591E-03
4.439999E-01	1.591376E-01	1.290883E-01	-8.95049E-02	6.920131E-02	2.637543E-01	1.675044E-03
4.480783E-01	1.627408E-01	1.294935E-01	-8.949707E-02	6.940932E-02	3.980591E-01	1.735772E-03
4.625000E-01	1.627310E-01	1.295061E-01	-8.990103E-02	6.950892E-02	9.702699E-01	1.736742E-03
4.625000E-01	1.592836E-01	1.307142E-01	-8.864846E-02	6.95708E-03	1.771823E-02	1.913425E-03
4.625999E-01	1.592598E-01	1.307246E-01	-8.864233E-02	6.957123E-03	1.233791E-00	1.915158E-03
4.731000E-01	1.567498E-01	1.316057E-01	-8.631709E-02	6.93027E-03	1.302054E-02	2.045364E-03
4.733284E-01	1.564499E-01	1.316249E-01	-8.632527E-02	6.93032E-03	2.88039E-00	2.048244E-03
4.810999E-01	1.462409E-01	1.281905E-01	-8.343274E-02	6.945108E-03	9.679794E-01	2.145042E-03
4.896284E-01	1.252171E-01	1.252171E-01	-7.943057E-02	6.94592E-03	6.419412E-01	2.229236E-03
4.931285E-01	1.228750E-01	1.228750E-01	-7.600356E-02	6.937865E-03	6.648273E-01	2.295719E-03
5.072284E-01	7.168746E-00	7.168746E-00	-6.881152E-02	6.94744E-03	1.775520E-02	2.473271E-03
5.282285E-01	6.224995E-00	6.224995E-00	-6.143794E-02	6.91070E-03	2.662979E-02	2.739569E-03
5.332285E-01	6.916601E-00	6.916601E-00	-5.972979E-02	6.932205E-03	6.37238E-01	2.80327E-03
5.407285E-01	5.641815E-00	5.641815E-00	-5.72994E-02	6.96355E-03	9.582100E-01	2.899118E-03
5.451999E-01	4.881775E-00	4.881775E-00	-5.609604E-02	6.90590E-03	5.725099E-01	2.956375E-03
5.459999E-01	4.349998E-00	4.349998E-00	-5.536294E-02	6.916010E-03	4.012013E-01	2.996495E-03
5.575999E-01	4.033905E-00	4.033905E-00	-5.341430E-02	6.95610E-03	1.191684E-02	3.115603E-03
5.625784E-01	3.864182E-00	3.864182E-00	-4.993376E-02	6.976084E-03	4.48329E-01	3.160499E-03
5.631285E-01	3.845428E-00	3.845428E-00	-4.982424E-02	6.980535E-03	7.045183E-00	3.167544E-03
5.645885E-01	3.797714E-00	3.797714E-00	-4.937524E-02	6.982212E-03	1.023519E-01	3.185316E-03
5.653284E-01	3.770447E-00	3.770447E-00	-4.942329E-02	6.987903E-03	1.023519E-01	3.195551E-03
5.681285E-01	3.674999E-00	3.674999E-00	-4.893723E-02	6.997315E-03	3.507197E-01	3.231223E-03
5.703885E-01	3.609573E-00	3.609573E-00	-4.836289E-02	6.994935E-03	2.883456E-01	3.260058E-03
5.776285E-01	3.399998E-00	3.399998E-00	-4.703259E-02	6.920958E-03	9.262752E-01	3.352685E-03
5.878284E-01	4.199999E-00	4.199999E-00	-4.675254E-02	6.92062000E-03	1.307153E-02	3.483400E-03

READING = 0038 BLOCK = 80 TIME = 113.347 MACH 6.0 PT = 746.749 TT = 2977.4

XABS	P-IN	P-OUT	PDA	G0X	DAWALL	CAVALL
6.079285E 01	2.624997E 00	2.624997E 00	-1.667292E 02	-2.117815E 03	2.578855E 02	3.741286E 03
6.231284E 01	2.112498E 00	2.112498E 00	-1.667292E 02	-2.152581E 03	1.821893E 02	3.923475E 03
6.401685E 01	3.842499E 00	3.842499E 00	-1.667292E 02	-2.220319E 03	3.161379E 02	4.239609E 03
6.505284E 01	4.687500E 00	4.687500E 00	-1.667292E 02	-2.231020E 03	4.824000E 01	4.287848E 03
6.509285E 01	4.687500E 00	4.687500E 00	-1.667292E 02	-2.233834E 03	5.134232E 00	4.292980E 03
6.525285E 01	4.530070E 00	4.530070E 00	-1.667292E 02	-2.236838E 03	2.565889E 01	4.318637E 03
6.695285E 01	3.229000E 00	3.229000E 00	-1.667292E 02	-2.279802E 03	2.159020E 02	4.534535E 03
6.762285E 01	2.703735E 00	2.703735E 00	-1.667292E 02	-2.292264E 03	8.175094E 01	4.616289E 03
6.832284E 01	2.099998E 00	2.099998E 00	-2.635715E 02	-2.305454E 03	9.480736E 01	4.711094E 03
6.911284E 01	1.856384E 00	1.856384E 00	-2.064395E 02	-2.317470E 03	8.790805E 01	4.799000E 03
6.972284E 01	1.649999E 00	1.649999E 00	-1.685386E 02	-2.327853E 03	7.402168E 01	4.873020E 03
6.992284E 01	1.571014E 00	1.571014E 00	-1.583672E 02	-2.330048E 03	2.417622E 01	4.897195E 03
7.067284E 01	1.274830E 00	1.274830E 00	-1.237498E 02	-2.342302E 03	9.022328E 01	4.987418E 03
7.11284E 01	1.105000E 00	1.105000E 00	-1.078357E 02	-2.348850E 03	5.202014E 01	5.039441E 03
7.262284E 01	1.155089E 00	1.155089E 00	-1.075098E 01	-2.365216E 03	1.842812E 02	5.223719E 03
7.276284E 01	1.160000E 00	1.160000E 00	-1.058203E 01	-2.365569E 03	1.724117E 01	5.240457E 03
7.353284E 01	1.100505E 00	1.100505E 00	-6.972412E 00	-2.374968E 03	2.453413E 01	5.325488E 03
7.353683E 01	1.100167E 00	1.100167E 00	-5.682129E 00	-2.375021E 03	1.620043E 01	5.325648E 03
7.486284E 01	9.949999E 01	9.949999E 01	1.644824E 01	-2.393065E 03	5.187865E 01	5.377523E 03
7.771284E 01	4.699999E 01	4.699999E 01	4.574023E 01	-2.379221E 03	9.820015E 01	5.775727E 03
8.161284E 01	8.649998E 01	8.649998E 01	7.409735E 01	-2.360246E 03	1.049644E 02	5.580688E 03
8.442284E 01	2.749999E 01	2.749999E 01	8.758521E 01	-2.335050E 03	5.457251E 01	5.635258E 03
8.728284E 01	8.649998E 01	8.649998E 01	1.013396E 02	-2.262289E 03	2.268561E 01	5.657941E 03
8.728885E 01	8.662419E 01	8.662419E 01	1.013450E 02	-2.262175E 03	0.000000	5.657941E 03



READING = 0038 BLOCK = 86 TIME = 11.147 MACH 6.0 PT = 740.749 TT = 2977.4

X	DURAG	CORAG	CF	HC
4.039999E 01	1.243762E 02	1.243762E 02	2.319009E-03	4.596929E-02
4.040999E 01	1.769994E-01	1.245532E 02	2.320057E-03	4.599152E-02
4.130783E 01	1.588371E 01	1.404309E 02	2.311839E-03	4.806814E-02
4.137285E 01	1.155864E 00	1.415928E 02	2.424574E-03	4.890740E-02
4.150000E 01	2.267560E 00	1.438403E 02	2.436931E-03	4.923733E-02
4.245999E 01	1.696906E 01	1.604294E 02	2.492844E-03	5.037832E-02
4.449205E 01	2.823270E 01	1.890821E 02	2.526451E-03	4.930612E-02
4.449998E 01	3.680124E 01	1.927028E 02	2.529845E-03	4.930025E-02
4.449999E 01	8.303581E 00	2.011068E 02	2.535634E-03	4.923104E-02
4.460783E 01	1.342996E-01	2.011202E 02	2.535766E-03	4.921903E-02
4.625000E 01	2.725928E-01	2.012026E 02	2.535766E-03	3.363898E-02
4.625999E 01	2.087377E-01	2.284619E 02	3.125676E-03	3.363898E-02
4.711000E 01	1.932478E 01	2.479994E 02	2.579597E-03	3.863863E-02
4.732804E 01	3.710495E-01	2.483305E 02	2.579597E-03	3.863863E-02
4.810999E 01	1.198325E 01	2.603496E 02	2.549492E-03	3.704679E-02
4.878204E 01	9.600500E 00	2.669502E 02	2.521886E-03	3.433482E-02
4.912895E 01	7.225097E 01	2.771758E 02	2.602222E-03	3.199774E-02
5.072204E 01	1.759486E 01	2.947705E 02	2.466284E-03	2.218897E-02
5.222895E 01	2.164474E 01	3.164172E 02	2.377928E-03	1.931791E-02
5.322895E 01	4.467965E 00	3.208850E 02	2.364183E-03	2.091085E-02
5.407205E 01	6.356026E 00	3.272455E 02	2.336431E-03	1.792558E-02
5.451999E 01	3.656081E 00	3.308999E 02	2.324098E-03	1.605461E-02
5.493204E 01	2.550368E 00	3.334482E 02	2.319495E-03	1.441220E-02
5.575999E 01	7.294729E 00	3.407429E 02	2.315243E-03	1.371670E-02
5.65784E 01	2.331964E 00	3.430747E 02	2.305899E-03	1.268560E-02
5.631285E 01	8.256338E-01	3.434049E 02	2.262735E-03	1.006428E-02
5.645205E 01	8.270574E-01	3.442231E 02	2.260187E-03	9.991091E-03
5.632804E 01	4.710521E-01	3.446022E 02	2.253761E-03	1.245670E-02
5.691285E 01	1.626324E 00	3.463243E 02	2.245075E-03	1.231113E-02
5.703005E 01	1.366631E 00	3.476902E 02	2.243222E-03	1.138333E-02
5.776285E 01	4.379329E 00	3.520701E 02	2.238465E-03	1.130527E-02
5.816284E 01	5.806091E 01	3.578770E 02	2.233520E-03	1.333068E-02
5.879205E 01	1.162705E 01	3.695039E 02	2.220795E-03	9.452570E-03
6.221284E 01	8.683508E 00	3.781875E 02	2.239425E-03	8.009963E-03
6.407685E 01	1.467595E 01	3.928633E 02	2.247038E-03	1.242385E-02
6.505284E 01	2.050752E 00	3.949229E 02	2.315521E-03	1.345139E-02
6.519285E 01	2.054918E-01	3.951282E 02	2.307462E-03	1.364348E-02
6.592895E 01	9.950356E-01	3.961230E 02	2.306612E-03	1.302153E-02
6.695205E 01	8.329524E 00	4.044542E 02	2.300247E-03	1.360346E-02
6.732285E 01	2.883326E 00	4.073337E 02	2.243005E-03	1.077639E-02
6.839204E 01	2.832044E 00	4.101677E 02	2.196257E-03	8.99186E-03
6.911284E 01	2.259841E 00	4.124275E 02	2.153118E-03	7.514350E-03
6.972284E 01	1.623367E 00	4.140508E 02	2.105927E-03	6.137382E-03
6.972284E 01	4.673042E-01	4.145181E 02	2.086104E-03	5.644303E-03
7.007204E 01	1.708279E 00	4.162203E 02	2.093017E-03	5.855035E-03
7.110284E 01	9.735366E-01	4.17197E 02	2.078376E-03	5.490735E-03
7.203204E 01	3.276093E 00	4.204794E 02	2.064128E-03	5.210482E-03
7.270204E 01	2.955719E-01	4.207710E 02	2.056483E-03	5.057197E-03
7.333284E 01	1.308787E 00	4.220796E 02	2.009365E-03	4.119497E-03
7.35603E 01	2.279369E-03	4.220818E 02	2.008712E-03	4.114643E-03
7.466284E 01	7.602496E-01	4.228418E 02	2.024103E-03	4.502855E-03
7.771284E 01	1.185428E 00	4.240271E 02	1.894289E-03	2.552153E-03
8.101284E 01	1.201765E 00	4.252288E 02	1.980736E-03	4.071932E-03
8.442284E 01	5.379094E-01	4.257666E 02	1.792018E-03	1.683544E-03
8.788284E 01	2.203017E-01	4.259868E 02	1.958607E-03	3.962692E-03
8.78885E 01	0.000000	4.259868E 02	1.958625E-03	3.966924E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0038 BLOCK = 80 TIME = 113.317 MACH 6.0 PI = 740.749 TT = 2977.4

## RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... -340. (LBF)  
 MEASURED THRUST..... 93. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... -1203. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 345. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... -0.1367  
 MEASURED THRUST COEFFICIENT..... 0.0373

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 4809. (LBF)  
 NET THRUST..... -203. (LBF)  
 SPECIFIC IMPULSE..... -748. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... -0.0810

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 124.4 (LBF)  
 INLET MOMENTUM CHANGE..... -829.2 (LBF)  
 COMBUSTOR FRICTION DRAG..... 270.5 (LBF)  
 COMBUSTOR STRUT DRAG..... 15.48 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... -44. (LBF)  
 NOZZLE FRICTION DRAG..... 31.07 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 537. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 568. (LBF)  
 EXTERNAL FRICTION DRAG..... 58.78 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1025. (LBF)  
 TOTAL EXTERNAL DRAG..... -1084. (LBF)  
 TOTAL STRUT DRAG..... 15.48 (LBF)  
 CAVITY FORCE..... -1359. (LBF)  
 CALCULATED LOAD CELL FORCE..... -2783. (LBF)  
 MEASURED LOAD CELL FORCE..... -2349. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9865  
 ADDITIVE DRAG COEFFICIENT..... 0.0004  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1570 (PSI)  
 DELTA PT2..... 0.1218  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3231  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1594  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8831  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9031  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9256  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 1.11 (BTU/LBM)  
 ENTHALPY AT PU - SUPERSONIC..... 30.16 (BTU/LBM)  
 ENTHALPY AT PU - SUBSONIC.....

## COMBUSTOR

FUEL-AIR RATIO..... 0.0101  
 EQUIVALENCE RATIO..... 0.300  
 COMBUSTOR EFFICIENCY..... 0.002  
 TOTAL PRESSURE RATIO..... 0.2609  
 COMBUSTOR EFFECTIVENESS..... 0.2372  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS..... 1.0055  
 NOZZLE COEFFICIENT - CT..... 0.9618  
 PROCESS EFFICIENCY..... 1.0425  
 KINETIC ENERGY EFFICIENCY..... 1.0114

## STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3124 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.197 (IN)  
 NOZZLE SHOULDER TRAILING EDGE..... 73.537 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.289 (IN)  
 STRUT LEADING EDGE..... 50.453 (IN)  
 STRUT TRAILING EDGE..... 65.053 (IN)  
 COMBUSTOR EXIT..... 65.053 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	70.400	
1B	41.298	
1C	44.300	
2A	48.773	
2C	46.250	
3A	54.063	
3B	56.248	
4	44.798	

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ORIGINAL PAGE IS  
OF POOR QUALITY

Reading 38

$t = 116.95 \text{ sec,}$

The fuel valve for injector 2C failed open; therefore, data are for a transient rate of fuel flow.

12/23/94

HEADING = 0038 BLOCK = 90 TIME = 110.747 WIND DIR = 705.747 31 = 2000.0  
WIND PERFORMANCE

S U M M A R Y R E P O R T

P	T	M	GAMMA	MOLNT	SONV	MALM	VEL	S	N/A	A	A/P/C	MUMTM	G	IVAC	P-D-I	ETAC		
WIND TUNNEL	1	5																
0.000	745.749	2982	664.00	789	1.2932	28.972	2573											
0.000	0.386	403	532.00	97	1.3989	28.971	984	5.997	5901	1.025	0.10593	26.752	0.9860	5005	9.715	187.1		
SPIKE TIP N8	2	4																
0.000	18.050	2982	664.00	789	1.2931	28.971	2572											
0.000	18.323	2915	643.60	769	1.2953	28.971	2545	0.346	1009	2.081	0.10593	26.752	0.9860	4961	1.061	185.4		
WIND TUNNEL	3	0																
0.000	745.749	2982	664.00	789	1.2932	28.972	2573											
0.000	0.380	402	532.50	96	1.3988	28.971	982	6.012	5903	1.025	0.10479	26.464	0.9860	4952	9.614	187.1		
SPIKE TIP N8	4	0																
0.000	18.050	2982	664.00	789	1.2931	28.971	2572											
0.000	18.365	2916	644.10	770	1.2952	28.971	2546	0.391	996	2.081	0.10479	26.464	0.9860	4952	1.022	187.1		
INLET THROAT	5	3																
0.000	280.798	2943	652.20	778	1.2945	28.972	2557											
0.000	15.996	1465	232.70	362	1.3848	28.971	1842	2.487	4581	1.888	0.93798	26.752	0.1114	4266	86.780	159.4		
INLET UPNASK	6	3																
0.000	280.798	2943	652.20	778	1.2945	28.972	2557											
0.000	13.733	1408	217.70	346	1.3531	28.971	1808	2.579	4663	1.888	0.85271	26.752	0.1225	4308	61.787	161.0		
INLET DOWNASK	7	0																
0.000	121.942	2943	652.20	778	1.2945	28.972	2557											
0.000	104.545	2841	421.60	748	1.2977	28.972	2515	0.491	1236	1.946	0.85271	26.752	0.1225	4308	16.381	161.0		
COMBUSTOR	8	1																
0.000	240.725	2903	653.90	799	1.2969	27.716	2599											
0.000	14.769	1467	230.00	378	1.3510	27.716	1885	2.443	4606	1.967	0.94119	26.647	0.1114	4204	67.364	158.6	0.11	0.07
COMBUSTOR	9	2																
0.000	182.805	2835	654.30	803	1.3004	26.815	2615											
0.000	19.901	1652	292.70	444	1.3427	26.815	2028	2.097	4254	2.031	0.94555	26.918	0.1111	4125	62.505	153.3	0.18	0.04
COMBUSTOR	10	3																
0.000	188.522	2802	654.20	793	1.3020	26.780	2602											
0.000	19.959	1618	293.30	434	1.3447	26.780	2010	2.114	4249	2.026	0.94534	26.918	0.1112	4124	62.430	153.2	0.18	0.01
COMBUSTOR	11	4																
0.000	186.436	2796	654.00	791	1.3023	26.775	2600											
0.000	20.334	1627	297.40	437	1.3444	26.775	2015	2.096	4224	2.026	0.94677	26.918	0.1110	4112	62.151	152.8	0.18	0.00
COMBUSTOR	12	5																
0.000	177.525	2813	653.50	796	1.3015	26.794	2606											
0.000	22.563	1703	313.80	459	1.3406	26.794	2058	2.003	4123	2.031	0.94699	26.918	0.1110	4090	60.671	152.0	0.18	0.02
COMBUSTOR	13	6																
0.000	116.633	3243	648.70	927	1.2810	27.284	2751											
0.000	39.625	2529	419.10	701	1.3050	27.285	2452	1.382	3589	2.094	0.93770	26.918	0.1121	3973	49.390	147.6	0.18	0.46
COMBUSTOR	14	7																
0.000	106.775	3372	638.50	964	1.2741	27.468	2789											
0.000	68.143	3057	534.10	864	1.2850	27.470	2667	0.857	2285	2.108	0.90547	26.918	0.1161	3938	32.159	146.3	0.18	0.62
COMBUSTOR	15	8																
0.000	106.568	3367	637.00	962	1.2743	27.467	2787											
0.000	68.149	3054	533.30	863	1.2851	27.469	2665	0.855	2279	2.107	0.90389	26.918	0.1163	3936	32.010	146.2	0.18	0.62
COMBUSTOR	16	9																
0.000	105.735	3323	633.10	949	1.2763	27.429	2773											
0.000	68.163	3018	532.30	852	1.2868	27.431	2653	0.846	2245	2.105	0.90037	26.918	0.1167	3916	31.419	145.5	0.18	0.54
COMBUSTOR	17	10																
0.000	105.674	3323	632.90	949	1.2763	27.424	2772											
0.000	68.086	3017	532.10	851	1.2869	27.431	2653	0.847	2247	2.105	0.90036	26.918	0.1167	3916	31.448	145.5	0.18	0.54
COMBUSTOR	18	11																
0.000	102.207	3319	625.90	947	1.2762	27.444	2770											
0.000	62.422	2978	513.00	839	1.2880	27.451	2635	0.849	2370	2.106	0.88473	26.918	0.1191	3866	32.516	144.4	0.18	0.61



READING = 0036 BLOCK = 90 TIME = 116.94/ MACH 0.0 PI = 7.5.7.7.11 = 2482.1

	P	T	M	GAMMA	MOMENT	SUNV	MACH	VEL	S	A/A	A	A/AC	PUMP	U	IVAC	PHI	ELAC
COMBUSTOR	0	38	31	4													
57.705	59.407	4010	599.5	(1438)	1.2386	22.749	3295										
57.705	10.925	2820	97.8	(964)	1.2863	22.781	2613	1.781	5011	2.600	0.28623	27.512	0.3753	5335	24.606	193.9	0.85 0.44
COMBUSTOR	0	39	32	7													
58.705	93.502	3389	594.4	(1201)	1.2753	22.151	3115										
58.705	6.582	1822	99.9	(603)	1.3319	22.154	2334	2.360	5508	2.526	0.28441	27.512	0.3777	5349	24.347	194.3	0.85 0.31
COMBUSTOR	0	40	33	6													
60.705	52.051	4420	590.8	(1595)	1.2077	23.201	3382										
60.705	14.900	3514	167.2	(1226)	1.2514	23.293	3063	1.503	4604	2.636	0.29431	27.512	0.3650	5330	21.057	193.7	0.85 0.64
COMBUSTOR	0	41	34	4													
62.215	50.468	4609	506.7	(1668)	1.1923	23.417	3416										
62.215	17.636	3863	210.4	(1361)	1.2294	23.552	3166	1.371	4340	2.645	0.30228	27.512	0.3553	5310	20.386	193.3	0.85 0.71
COMBUSTOR	0	42	35	4													
64.679	45.909	4750	579.1	(1723)	1.1790	23.592	3435										
64.679	19.151	4156	252.3	(1875)	1.2074	23.764	3240	1.248	4043	2.657	0.28653	27.512	0.3749	5246	18.003	192.5	0.85 0.78
COMBUSTOR	0	43	36	4													
65.055	41.824	4864	577.8	(1767)	1.1680	23.722	3450										
65.055	20.058	4391	294.1	(1568)	1.1879	23.919	3293	1.144	3767	2.667	0.28638	27.512	0.4032	5293	15.598	192.4	0.85 0.84
COMBUSTOR	0	44	37	4													
65.055	41.824	4894	600.9	(1780)	1.1663	23.698	3461										
65.055	20.530	4440	321.5	(1589)	1.1845	23.899	3308	1.126	3725	2.672	0.28638	27.512	0.4032	5306	15.422	192.4	0.85 0.84
NOZZLE	AE	45	38	5													
67.291	41.824	4864	577.8	(1757)	1.1680	23.722	3450										
67.291	1.259	2601	500.6	(857)	1.2780	24.090	2519	2.805	7346	2.667	0.05545	27.512	1.9371	6906	6.330	251.0	0.85 0.84
NOZZLE	PO	46	39	5													
67.291	41.824	4864	577.8	(1757)	1.1680	23.722	3450										
67.291	0.386	1994	723.5	(635)	1.3018	24.091	2315	3.486	8069	2.667	0.02437	27.512	4.4083	7337	3.056	266.7	0.85 0.84
NOZZLE	AE	47	40	5													
67.291	41.824	4894	600.9	(1780)	1.1663	23.698	3461										
67.291	1.273	2640	488.8	(872)	1.2766	24.090	2537	2.796	7374	2.672	0.05545	27.512	1.9371	6937	6.355	252.2	0.85 0.84
NOZZLE	PO	48	41	5													
67.291	41.824	4894	600.9	(1780)	1.1663	23.698	3461										
67.291	0.386	2021	713.0	(645)	1.3006	24.091	2329	3.483	8112	2.672	0.02417	27.512	4.4400	7376	3.047	268.1	0.85 0.84
PCTIVE	COMBUSTOR	70	63	0													
65.055	280.798	5340	577.8	(1955)	1.1664	24.252	3573										
65.055	0.386	1466	1130.9	(453)	1.3214	24.743	1987	4.655	9247	2.511	0.03848	27.512	2.7918	9183	5.529	297.9	0.85 1.00
PCTIVE	NOZZLE	71	64	0													
67.291	22.781	4794	565.5	(1739)	1.1621	23.676	3420										
67.291	1.705	5137	290.3	(1062)	1.2554	24.083	2851	2.295	6544	2.716	0.05545	27.512	1.9371	6442	5.640	234.2	0.85 0.84

ORIGINAL PAGE IS  
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READING = 0038 BLOCK = 90 TIME = 116.947 MACH 6.0 PT = 745.744 TT = 2982.1

MACH	P-10	P-08	PDA	QVX	U-1R	Q-0H	CASALL	P-1R/P-10	P-0R/P-10	P-0R/P-10
5.878E 01	6.562E 00	6.562E 00	6.801E 02	-5.331E 03	-1.321E 03	-2.003E 03	5.403E 03	1.499E 01	1.499E 01	1.499E 01
6.079E 01	1.490E 01	1.490E 01	6.906E 02	-5.405E 03	-1.363E 03	-2.122E 03	5.741E 03	5.571E 01	5.571E 01	5.571E 01
6.221E 01	1.766E 01	1.766E 01	6.906E 02	-5.549E 03	-1.389E 03	-2.213E 03	5.923E 03	4.571E 01	4.571E 01	4.571E 01
6.408E 01	1.915E 01	1.915E 01	6.906E 02	-5.610E 03	-1.431E 03	-2.373E 03	4.200E 03	4.956E 01	4.956E 01	4.956E 01
6.505E 01	1.938E 01	1.938E 01	6.906E 02	-5.845E 03	-1.445E 03	-2.399E 03	4.288E 03	5.369E 01	5.369E 01	5.369E 01
6.509E 01	2.074E 01	1.940E 01	6.906E 02	-5.849E 03	-1.447E 03	-2.402E 03	4.293E 03	5.369E 01	5.369E 01	5.369E 01
6.529E 01	1.928E 01	1.952E 01	6.906E 02	-5.867E 03	-1.452E 03	-2.415E 03	4.319E 03	4.992E 01	4.992E 01	4.992E 01
6.695E 01	7.220E 00	8.270E 00	6.424E 02	-5.970E 03	-1.476E 03	-2.501E 03	4.535E 03	1.550E 01	1.550E 01	1.550E 01
6.762E 01	5.987E 00	9.685E 00	1.001E 03	-4.000E 03	-1.479E 03	-2.527E 03	4.610E 03	1.550E 01	1.550E 01	1.550E 01
6.839E 01	4.570E 00	7.552E 00	1.189E 03	-4.035E 03	-1.479E 03	-2.553E 03	4.711E 03	1.550E 01	1.550E 01	1.550E 01
6.911E 01	3.441E 00	5.370E 00	1.321E 03	-4.050E 03	-1.477E 03	-2.578E 03	4.799E 03	1.550E 01	1.550E 01	1.550E 01
6.972E 01	2.445E 00	4.154E 00	1.394E 03	-4.073E 03	-1.477E 03	-2.597E 03	4.873E 03	1.550E 01	1.550E 01	1.550E 01
6.992E 01	2.310E 00	1.100E 00	1.408E 03	-4.074E 03	-1.476E 03	-2.613E 03	4.897E 03	1.550E 01	1.550E 01	1.550E 01
7.067E 01	1.655E 00	1.535E 00	1.451E 03	-4.094E 03	-1.475E 03	-2.624E 03	4.937E 03	1.550E 01	1.550E 01	1.550E 01
7.110E 01	1.280E 00	1.581E 00	1.473E 03	-4.109E 03	-1.476E 03	-2.635E 03	5.039E 03	1.550E 01	1.550E 01	1.550E 01
7.263E 01	1.166E 00	1.745E 00	1.540E 03	-4.138E 03	-1.473E 03	-2.666E 03	5.224E 03	1.550E 01	1.550E 01	1.550E 01
7.278E 01	1.155E 00	3.999E 00	1.549E 03	-4.140E 03	-1.472E 03	-2.668E 03	5.241E 03	1.550E 01	1.550E 01	1.550E 01
7.334E 01	1.133E 00	1.241E 01	1.621E 03	-4.150E 03	-1.471E 03	-2.679E 03	5.307E 03	1.550E 01	1.550E 01	1.550E 01
7.353E 01	1.099E 00	6.650E-01	1.715E 03	-4.153E 03	-1.471E 03	-2.682E 03	5.334E 03	1.550E 01	1.550E 01	1.550E 01
7.354E 01	1.099E 00	4.141E-01	1.716E 03	-4.153E 03	-1.471E 03	-2.682E 03	5.334E 03	1.550E 01	1.550E 01	1.550E 01
7.486E 01	1.000E 00	0.000	1.738E 03	-4.161E 03	-1.470E 03	-2.711E 03	5.386E 03	1.550E 01	1.550E 01	1.550E 01
7.771E 01	1.160E 00	0.000	1.781E 03	-4.180E 03	-1.469E 03	-2.711E 03	5.386E 03	1.550E 01	1.550E 01	1.550E 01
8.161E 01	1.375E 00	0.000	1.835E 03	-4.180E 03	-1.469E 03	-2.711E 03	5.386E 03	1.550E 01	1.550E 01	1.550E 01
8.442E 01	6.650E-01	0.000	1.858E 03	-4.181E 03	-1.470E 03	-2.711E 03	5.386E 03	1.550E 01	1.550E 01	1.550E 01
8.728E 01	1.465E 00	0.000	1.884E 03	-4.182E 03	-1.471E 03	-2.711E 03	5.386E 03	1.550E 01	1.550E 01	1.550E 01
8.729E 01	1.467E 00	0.000	1.884E 03	-4.182E 03	-1.471E 03	-2.711E 03	5.386E 03	1.550E 01	1.550E 01	1.550E 01



HEADING = 0030 BLOCK = 40 TIME = 110.941 CALN 0.0 PI = 745.744 IT = 2982.1

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X	UDRAG	CURAG	CF	MC
4.000E 01	1.350E 02	1.350E 02	2.221E+03	4.360E+02
4.001E 01	1.470E+01	1.351E 02	2.501E+03	3.704E+02
4.130E 01	1.742E 01	1.526E 02	2.547E+03	4.654E+02
4.131E 01	1.837E+01	1.527E 02	2.433E+03	5.103E+02
4.132E 01	1.106E 00	1.539E 02	2.416E+03	5.140E+02
4.130E 01	2.226E 00	1.561E 02	2.439E+03	5.528E+02
4.240E 01	1.599E 01	1.721E 02	2.623E+03	7.445E+02
4.403E 01	2.255E 01	1.950E 02	3.040E+03	7.309E+02
4.431E 01	2.970E 00	1.976E 02	3.092E+03	7.045E+02
4.480E 01	5.853E 00	2.034E 02	3.080E+03	6.961E+02
4.481E 01	1.146E+01	2.035E 02	3.067E+03	7.015E+02
4.553E 01	8.652E 00	2.122E 02	3.022E+03	6.805E+02
4.628E 01	8.925E 00	2.211E 02	3.541E+03	8.172E+02
4.628E 01	1.184E+01	2.212E 02	2.955E+03	7.619E+02
4.731E 01	1.024E 01	2.315E 02	2.632E+03	7.749E+02
4.731E 01	2.288E+01	2.317E 02	2.882E+03	7.584E+02
4.811E 01	7.346E 00	2.390E 02	2.770E+03	7.703E+02
4.876E 01	7.235E 00	2.463E 02	2.633E+03	7.000E+02
4.931E 01	6.384E 00	2.526E 02	2.882E+03	6.165E+02
5.075E 01	1.707E 01	2.697E 02	2.800E+03	5.366E+02
5.202E 01	2.332E 01	2.830E 02	2.787E+03	4.402E+02
5.332E 01	5.332E 00	2.984E 02	2.866E+03	4.078E+02
5.407E 01	7.906E 00	3.063E 02	2.873E+03	3.823E+02
5.483E 01	7.771E 00	3.140E 02	2.866E+03	3.556E+02
5.576E 01	9.103E 00	3.231E 02	2.842E+03	3.360E+02
5.629E 01	2.998E 00	3.261E 02	2.635E+03	3.068E+02
5.631E 01	4.456E+01	3.262E 02	3.008E+03	2.446E+02
5.649E 01	1.159E 00	3.277E 02	2.793E+03	2.564E+02
5.653E 01	6.770E+01	3.284E 02	3.297E+03	2.642E+02
5.681E 01	2.370E 00	3.306E 02	3.003E+03	2.827E+02
5.704E 01	1.842E 00	3.326E 02	2.985E+03	2.756E+02
5.776E 01	5.997E 00	3.356E 02	2.926E+03	2.445E+02
5.878E 01	8.786E 00	3.373E 02	2.800E+03	1.833E+02
6.079E 01	1.509E 01	3.430E 02	2.560E+03	3.346E+02
6.221E 01	1.008E 01	3.736E 02	3.056E+03	3.163E+02
6.468E 01	1.891E 01	3.926E 02	3.176E+03	3.118E+02
6.503E 01	2.622E 00	3.952E 02	3.295E+03	2.908E+02
6.508E 01	2.656E+01	3.954E 02	3.414E+03	3.015E+02
6.829E 01	1.375E 00	3.968E 02	3.410E+03	2.967E+02
6.895E 01	1.117E 01	4.080E 02	3.285E+03	1.860E+02
6.762E 01	4.075E 00	4.121E 02	3.292E+03	1.910E+02
6.839E 01	4.519E 00	4.166E 02	3.258E+03	1.606E+02
6.911E 01	3.709E 00	4.203E 02	3.211E+03	1.242E+02
6.972E 01	2.472E 00	4.226E 02	3.120E+03	8.132E+03
6.992E 01	6.155E+01	4.234E 02	3.077E+03	6.460E+03
7.067E 01	2.048E 00	4.254E 02	3.065E+03	6.134E+03
7.110E 01	1.116E 00	4.265E 02	3.049E+03	5.643E+03
7.263E 01	3.845E 00	4.304E 02	3.045E+03	5.703E+03
7.278E 01	4.332E+01	4.308E 02	3.123E+03	6.747E+03
7.334E 01	2.501E 00	4.333E 02	3.257E+03	1.715E+02
7.353E 01	8.187E+01	4.341E 02	2.971E+03	3.808E+03
7.354E 01	2.346E+03	4.341E 02	2.949E+03	3.430E+03
7.466E 01	7.849E+01	4.349E 02	2.980E+03	4.254E+03
7.771E 01	1.692E 00	4.366E 02	2.945E+03	4.745E+03
8.161E 01	1.004E 00	4.386E 02	2.988E+03	5.368E+03
8.442E 01	8.891E+01	4.395E 02	2.878E+03	3.104E+03

READING = 0038 HLDCK = Y0 TRP = 114.401 VALP A.0 01 = 100.000 11 = 100.001

X	UDHAG	UDHAG	UDHAG	UDHAG	UDHAG
8.728E 01	3.746E-01	4.399E 02	2.970E-03	3.508E-03	
8.729E 01	0.000	4.399E 02	2.970E-03	3.508E-03	

ORIGINAL PAGE IS  
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RAJFT PERFORMANCE

ENGINE PERFORMANCE

THRUST

CALCULATED THRUST.....	1335. (LBF)	ANGLE OF ATTACK.....	0.000 (DEGREES)
MEASURED THRUST.....	1332. (LBF)	MASS FLOW RATIO.....	0.9860
MEASURED SPECIFIC IMPULSE.....	2542. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1012
CALCULATED THRUST COEFFICIENT.....	0.5767	DELTA P/2.....	0.1104 (PSI)
MEASURED THRUST COEFFICIENT.....	0.7766	TOTAL PRESSURE RECOVERY - SUPERSONIC.....	0.3165
		TOTAL PRESSURE RECOVERY - SUBSONIC.....	0.1035
		INLET PROCESS EFFICIENCY - SUPERSONIC.....	0.8902
		INLET PROCESS EFFICIENCY - SUBSONIC.....	0.9038
		KINETIC ENERGY EFFICIENCY - SUPERSONIC.....	0.9413
		KINETIC ENERGY EFFICIENCY - SUBSONIC.....	0.8927
		ENTHALPY AT PU - SUPERSONIC.....	-2.49 (BTU/LBM)
		ENTHALPY AT PU - SUBSONIC.....	30.87 (BTU/LBM)

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED	
STREAM THRUST.....	6471. (LBF)
NET THRUST.....	1864. (LBF)
SPECIFIC IMPULSE.....	1926. (LBF-SEC/LBM)
THRUST COEFFICIENT.....	0.3684

MOMENTUM AND FORCES

INLET FRICTION DRAG.....	135.0 (LBF)	FUEL-AIR RATIO.....	0.0284
INLET MOMENTUM CHANGE.....	-741.5 (LBF)	EQUIVALENCE RATIO.....	0.849
COMBUSTOR FRICTION DRAG.....	260.2 (LBF)	COMBUSTOR EFFICIENCY.....	0.800
COMBUSTOR STRUT DRAG.....	9.14 (LBF)	TOTAL PRESSURE RATIO.....	0.1469
COMBUSTOR MOMENTUM CHANGE.....	1028. (LBF)	COMBUSTOR EFFECTIVENESS.....	0.7839
NOZZLE FRICTION DRAG.....	44.70 (LBF)	INJECTOR DISCHARGE COEFFICIENTS	
NOZZLE STRUT DRAG.....	0.00 (LBF)		
NOZZLE MOMENTUM CHANGE.....	1149. (LBF)		
NOZZLE PRESSURE INTEGRAL.....	1194. (LBF)		
EXTERNAL FRICTION DRAG.....	56.44 (LBF)		
EXTERNAL PRESSURE INTEGRAL.....	-981. (LBF)		
TOTAL EXTERNAL DRAG.....	-1039. (LBF)		
TOTAL STRUT DRAG.....	9.14 (LBF)		
CAVITY FORCE.....	-1305. (LBF)		
CALCULATED LOAD CELL FORCE.....	-904. (LBF)		
MEASURED LOAD CELL FORCE.....	-812. (LBF)		
FUEL VACUUM SPECIFIC IMPULSE			

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS.....	0.9328
NOZZLE COEFFICIENT - CT.....	0.8320
PROCESS EFFICIENCY.....	0.8324
KINETIC ENERGY EFFICIENCY.....	0.8464

STATIONS

NOMINAL CONE LEADING EDGE.....	34.884 (IN)
SPIKE TRANSLATION.....	0.3146 (IN)
INLET THROAT.....	40.400 (IN)
CONE LEADING EDGE.....	35.194 (IN)
NOZZLE SHROUD TRAILING EDGE.....	73.534 (IN)
NOZZLE PLUG TRAILING EDGE.....	67.291 (IN)
STRUT LEADING EDGE.....	56.459 (IN)
STRUT TRAILING EDGE.....	65.055 (IN)
COMBUSTOR EXIT.....	65.055 (IN)

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.300	H
1C	44.300	
2A	48.775	
2C	46.250	E
3A	54.065	
3B	54.250	
4	44.800	

Reading 52

$t = 165,93 \text{ sec,}$

READING = 0052 BLOCK = 69 TIME = 165.929 MACH 6.0 PT = 743.999 IT = 2890.2  
RAMJET PERFORMANCE

SUMMARY REPORT

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	743.999	2890	636.3( 762)	1.2961	28.972	2535											
0.000	0.373	384	-36.6( 92)	1.3986	28.971	961	6.040	5803	1.816	0.10567	26.796	0.9901	4927	9.529	183.9		
SPIKE TIP NS	2	0	5														
0.600	18.050	2890	636.3( 762)	1.2961	28.972	2535											
0.600	16.394	2827	617.4( 744)	1.2981	28.972	2510	0.387	972	2.071	0.10567	26.796	0.9901	4967	1.596	1.4		
WIND TUNNEL	3	0	0														
0.000	743.999	2890	636.3( 762)	1.2961	28.972	2535											
0.000	0.379	386	-36.2( 95)	1.3986	28.971	963	6.027	5801	1.816	0.10670	27.058	0.9901	4975	9.619	183.9		
SPIKE TIP NS	4	0	0														
0.600	18.050	2890	636.3( 762)	1.2961	28.972	2535											
0.600	16.357	2826	617.0( 743)	1.2981	28.972	2509	0.392	983	2.071	0.10670	27.058	0.9901	4975	1.630	183.9		
INLET THROAT	5	0	4														
40.400	285.680	2851	624.4( 750)	1.2974	28.972	2519											
40.400	15.486	1394	214.2( 343)	1.3539	28.971	1800	2.517	4531	1.878	0.94344	26.796	0.1109	4213	66.429	157.2		
INLET UPNRSK	6	0	3														
40.400	285.680	2851	624.4( 750)	1.2974	28.972	2519											
40.400	13.298	1340	199.9( 329)	1.3572	28.971	1766	2.609	4609	1.878	0.85767	26.796	0.1220	4254	61.432	158.8		
INLET DNRSK	7	0	4														
40.400	120.996	2851	624.4( 750)	1.2974	28.972	2519											
40.400	103.842	2752	595.1( 722)	1.3005	28.972	2478	0.489	1212	1.937	0.85767	26.796	0.1220	4254	16.160	158.8		
COMBUSTOR	8	1	4														
40.410	284.949	2851	624.4( 750)	1.2974	28.972	2519											
40.410	15.507	1396	214.6( 343)	1.3538	28.971	1801	2.515	4529	1.878	0.94332	26.796	0.1109	4212	66.390	157.2		
COMBUSTOR	9	2	4														
41.330	225.566	2844	622.5( 749)	1.2976	28.972	2517											
41.330	17.998	1537	252.0( 381)	1.3458	28.971	1884	2.285	4306	1.893	0.94504	26.796	0.1107	4096	63.234	152.9		
COMBUSTOR	10	3	4														
41.395	222.193	2844	622.3( 748)	1.2976	28.972	2516											
41.395	18.191	1547	254.7( 383)	1.3453	28.971	1890	2.270	4289	1.894	0.94551	26.796	0.1106	4088	63.025	152.6		
COMBUSTOR	11	4	4														
41.500	216.817	2843	622.0( 748)	1.2976	28.972	2516											
41.500	18.495	1563	258.9( 388)	1.3444	28.971	1899	2.245	4263	1.896	0.94573	26.796	0.1106	4074	62.652	152.1		
COMBUSTOR	12	5	5														
42.460	188.160	2832	619.0( 745)	1.2980	28.972	2512											
42.460	20.050	1648	281.6( 410)	1.3401	28.971	1947	2.111	4108	1.904	0.93738	26.796	0.1116	3995	59.850	149.1		
COMBUSTOR	13	6	4														
44.115	168.764	2812	613.0( 739)	1.2986	28.972	2503											
44.115	20.227	1684	291.5( 420)	1.3384	28.971	1967	2.039	4010	1.910	0.90311	26.796	0.1158	3940	56.287	147.0		
COMBUSTOR	14	7	4														
44.310	167.315	2810	612.2( 739)	1.2987	28.972	2502											
44.310	20.311	1688	292.6( 421)	1.3382	28.971	1969	2.031	3999	1.910	0.90230	26.796	0.1159	3934	56.082	146.8		
COMBUSTOR	15	8	4														
44.800	163.057	2804	610.5( 737)	1.2989	28.972	2500											
44.800	20.540	1700	295.8( 425)	1.3377	28.971	1975	2.009	3968	1.911	0.89893	26.796	0.1164	3917	55.437	146.2		
COMBUSTOR	16	9	4														
44.830	162.762	2804	610.4( 737)	1.2989	28.972	2500											
44.830	20.546	1701	296.0( 425)	1.3376	28.971	1976	2.007	3966	1.911	0.89845	26.796	0.1164	3916	55.381	146.1		
COMBUSTOR	17	10	5														
46.260	146.758	2789	605.9( 732)	1.2994	28.972	2494											
46.260	19.955	1723	302.0( 431)	1.3366	28.971	1908	1.962	3900	1.917	0.84698	26.796	0.1235	3879	51.332	144.8		
COMBUSTOR	18	11	5														
47.310	133.943	2778	602.8( 729)	1.2997	28.972	2489											
47.310	18.783	1729	303.7( 432)	1.3363	28.971	1991	1.943	3869	1.922	0.78798	26.796	0.1328	3861	47.375	144.1		

READING = 0052 BLOCK = 69 TIME = 165.929 MACH 6.0 PT = 743.999 IT = 2890.2

	P	T	H	S	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	5														
47.355	133.430	2778	602.7	(729)	1.2997	28.972	2489											
47.355	18.772	1730	304.0	(433)	1.3363	28.971	1992	1.941	3866	1.922	0.78644	26.796	0.1330	3859	47.248	144.0		
COMBUSTOR	0	20	13	5														
48.110	125.874	2771	600.6	(727)	1.2999	28.972	2486											
48.110	17.327	1716	300.1	(429)	1.3369	28.971	1984	1.954	3877	1.925	0.73412	26.796	0.1425	3862	44.235	144.1		
COMBUSTOR	0	21	14	4														
48.805	120.402	2764	598.7	(725)	1.3002	28.972	2484											
48.805	15.326	1678	289.9	(419)	1.3387	28.971	1963	2.002	3931	1.928	0.67321	26.796	0.1554	3884	41.127	144.9		
COMBUSTOR	0	22	15	4														
49.335	117.596	2760	597.3	(724)	1.3003	28.972	2482											
49.335	13.841	1642	280.1	(409)	1.3404	28.971	1943	2.050	3984	1.929	0.62961	26.796	0.1662	3907	38.982	145.8		
COMBUSTOR	0	23	16	5														
50.745	109.361	2749	594.2	(721)	1.3006	28.972	2477											
50.745	11.018	1571	261.2	(390)	1.3440	28.971	1904	2.144	4082	1.933	0.53660	26.796	0.1950	3950	34.042	147.4		
COMBUSTOR	0	24	17	4														
52.845	98.001	2736	590.4	(717)	1.3011	28.972	2472											
52.845	8.444	1502	242.5	(371)	1.3477	28.971	1864	2.239	4172	1.939	0.43981	26.796	0.2379	3989	28.515	148.9		
COMBUSTOR	0	25	18	4														
53.345	96.450	2734	589.5	(716)	1.3011	28.972	2471											
53.345	7.950	1483	237.6	(366)	1.3488	28.971	1853	2.265	4197	1.940	0.42184	26.796	0.2480	4000	27.512	149.3		
COMBUSTOR	0	26	19	4														
54.095	94.277	2730	588.4	(715)	1.3013	28.972	2469											
54.095	7.304	1457	230.7	(359)	1.3503	28.971	1837	2.303	4231	1.941	0.39764	26.796	0.2631	4016	26.144	149.9		
COMBUSTOR	0	27	20	4														
54.855	92.095	2726	587.3	(714)	1.3014	28.972	2467											
54.855	6.751	1434	224.6	(353)	1.3516	28.971	1824	2.336	4260	1.942	0.37602	26.796	0.2782	4029	24.694	150.4		
COMBUSTOR	0	28	21	5														
55.760	89.394	2722	586.1	(713)	1.3015	28.972	2466											
55.760	6.208	1412	218.7	(348)	1.3529	28.971	1810	2.368	4288	1.944	0.35352	26.796	0.2959	4041	23.556	150.8		
COMBUSTOR	0	29	22	4														
56.280	77.568	2720	585.5	(712)	1.3016	28.972	2465											
56.280	4.755	1365	206.6	(335)	1.3556	28.971	1782	2.444	4355	1.953	0.28438	26.796	0.3679	4075	19.246	152.1		
COMBUSTOR	0	30	23	5														
56.335	77.482	2720	585.5	(712)	1.3016	28.972	2465											
56.335	4.737	1364	206.3	(335)	1.3557	28.971	1781	2.445	4356	1.953	0.28358	26.796	0.3689	4075	19.197	152.1		
COMBUSTOR	0	31	24	5														
56.475	77.209	2719	585.3	(712)	1.3016	28.972	2465											
56.475	4.691	1362	205.6	(334)	1.3559	28.971	1780	2.449	4359	1.953	0.28154	26.796	0.3716	4077	19.072	152.1		
COMBUSTOR	0	32	25	4														
56.555	78.218	2719	585.3	(712)	1.3016	28.972	2464											
56.555	4.736	1360	205.3	(334)	1.3559	28.971	1779	2.451	4361	1.952	0.28464	26.796	0.3675	4077	19.289	152.2		
COMBUSTOR	0	33	26	5														
56.835	78.433	2718	585.0	(712)	1.3016	28.972	2464											
56.835	4.702	1356	204.2	(333)	1.3562	28.971	1777	2.457	4365	1.952	0.28375	26.796	0.3687	4079	19.249	152.2		
COMBUSTOR	0	34	27	5														
57.061	78.610	2717	584.8	(712)	1.3017	28.972	2464											
57.061	4.683	1353	203.5	(332)	1.3564	28.971	1775	2.461	4368	1.952	0.28332	26.796	0.3693	4081	19.232	152.3		
COMBUSTOR	0	35	28	5														
57.785	78.006	2715	584.1	(711)	1.3017	28.972	2463											
57.785	4.580	1347	201.8	(331)	1.3567	28.971	1771	2.470	4374	1.952	0.27878	26.796	0.3753	4083	18.949	152.4		
COMBUSTOR	0	36	29	4														
58.805	77.955	2712	583.2	(710)	1.3018	28.972	2462											
58.805	4.529	1342	200.4	(329)	1.3571	28.971	1768	2.476	4377	1.952	0.27700	26.796	0.3777	4083	18.840	152.4		
COMBUSTOR	0	37	30	5														
60.815	79.101	2707	581.6	(709)	1.3020	28.972	2459											
60.815	4.736	1349	202.4	(331)	1.3566	28.971	1772	2.458	4356	1.950	0.28664	26.796	0.3650	4071	19.405	151.9		

READING = 0052 BLOCK = 69 TIME = 165.929 MACH 6.0 PT = 743.999 TT = 2090.2

	P	T	H	S	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	5														
62.235	79.938	2704	580.7	(708)	1.3021	28.972	2458											
62.235	4.908	1356	204.3	(333)	1.3562	28.971	1777	2.443	4340	1.949	0.29441	26.796	0.3553	4061	19.857	151.6		
COMBUSTOR	0	39	32	4														
64.699	73.762	2698	579.0	(706)	1.3023	28.972	2455											
64.699	4.722	1368	207.3	(336)	1.3555	28.971	1784	2.417	4313	1.954	0.27907	26.796	0.3749	4045	18.703	151.0		
COMBUSTOR	0	40	33	3														
65.075	68.319	2697	578.7	(706)	1.3023	28.972	2455											
65.075	4.399	1370	207.7	(337)	1.3554	28.971	1785	2.414	4309	1.959	0.25944	26.796	0.4032	4043	17.372	150.9		
NOZZLE	41	34	3															
87.311	68.319	2697	578.7	(706)	1.3023	28.972	2455											
87.311	0.392	706	41.0	(170)	1.3938	28.971	1300	3.991	5187	1.959	0.05401	26.796	1.9371	4515	4.354	168.5		
NOZZLE	42	35	3															
87.311	68.319	2697	578.7	(706)	1.3023	28.972	2455											
87.311	0.373	697	38.6	(167)	1.3941	28.971	1291	4.027	5199	1.959	0.05226	26.796	2.0019	4521	4.222	168.7		
FICTIVE COMBUSTOR	62	55	0															
65.075	285.680	2697	578.7	(706)	1.3023	28.972	2455											
65.075	0.373	464	-17.6	(111)	1.3991	28.971	1055	5.177	5462	1.861	0.08249	26.796	1.2683	4671	7.002	174.3		
FICTIVE NOZZLE	63	56	0															
87.311	79.001	2679	573.4	(700)	1.3029	28.972	2447											
87.311	0.363	658	29.2	(158)	1.3955	28.971	1255	4.158	5218	1.947	0.05401	26.796	1.9371	4526	4.380	168.9		

READING = 0052 BLOCK = 69 TIME = 165.929 NACH 0.0 PT = 743.999 IT = 2090.2

XABS	P-IB	P-OB	PDA	G0X	G-IB	G-OB	CAVALL	P-IB/PSO	P-IB/PTO	P-OB/PSO	P-OB/PTO
6.981E-01	9.600E-01	0.000	-4.393E-01	0.000	0.000	0.000	2.470E-02	2.571E 00	1.290E-03	0.000	0.000
1.836E 01	9.600E-01	0.000	-3.200E 01	0.000	0.000	0.000	1.634E 02	2.571E 00	1.290E-03	0.000	0.000
3.070E 01	2.020E 00	0.000	-1.528E 02	0.000	0.000	0.000	5.053E 02	5.409E 00	2.715E-03	0.000	0.000
3.508E 01	3.840E 00	0.000	-3.427E 02	0.000	0.000	0.000	6.804E 02	1.028E 01	5.161E-03	0.000	0.000
3.521E 01	3.875E 00	5.544E 00	-4.081E 02	0.000	0.000	0.000	6.863E 02	1.038E 01	5.209E-03	1.484E 01	7.452E-03
3.522E 01	3.875E 00	5.507E 00	-4.081E 02	0.000	0.000	0.000	6.865E 02	1.038E 01	5.211E-03	1.475E 01	7.402E-03
3.555E 01	3.965E 00	3.464E 00	-4.161E 02	0.000	0.000	0.000	7.198E 02	1.062E 01	5.329E-03	9.277E 00	4.657E-03
3.588E 01	3.906E 00	1.400E 00	-4.332E 02	-1.773E 02	-1.773E 02	0.000	7.538E 02	1.046E 01	5.250E-03	3.749E 00	1.882E-03
3.606E 01	3.875E 00	2.349E 00	-4.434E 02	-1.773E 02	-1.773E 02	0.000	7.718E 02	1.038E 01	5.208E-03	6.290E 00	3.157E-03
3.648E 01	4.182E 00	4.624E 00	-4.630E 02	-1.817E 02	-1.817E 02	0.000	8.153E 02	1.120E 01	5.622E-03	1.238E 01	6.215E-03
3.701E 01	4.165E 00	7.495E 00	-4.845E 02	-2.042E 02	-1.874E 02	-1.684E 01	8.714E 02	1.115E 01	5.598E-03	2.007E 01	1.007E-02
3.702E 01	4.165E 00	7.575E 00	-4.851E 02	-2.046E 02	-1.875E 02	-1.711E 01	8.730E 02	1.115E 01	5.595E-03	2.028E 01	1.018E-02
3.734E 01	4.112E 00	7.862E 00	-4.956E 02	-2.140E 02	-1.911E 02	-2.290E 01	9.073E 02	1.101E 01	5.528E-03	2.105E 01	1.057E-02
3.787E 01	4.029E 00	1.107E 01	-5.115E 02	-2.296E 02	-1.973E 02	-3.228E 01	9.650E 02	1.079E 01	5.416E-03	2.966E 01	1.489E-02
3.803E 01	4.005E 00	1.117E 01	-5.133E 02	-2.342E 02	-1.992E 02	-3.501E 01	9.821E 02	1.072E 01	5.383E-03	2.992E 01	1.502E-02
3.836E 01	5.387E 00	1.138E 01	-5.182E 02	-2.444E 02	-2.036E 02	-4.089E 01	1.020E 03	1.442E 01	7.240E-03	3.048E 01	1.530E-02
3.875E 01	6.977E 00	1.435E 01	-5.234E 02	-2.568E 02	-2.105E 02	-4.910E 01	1.063E 03	1.868E 01	9.378E-03	3.842E 01	1.928E-02
3.883E 01	7.327E 00	1.500E 01	-5.232E 02	-2.596E 02	-2.105E 02	-4.910E 01	1.073E 03	1.962E 01	9.848E-03	4.017E 01	2.016E-02
3.901E 01	8.050E 00	1.482E 01	-5.228E 02	-2.655E 02	-2.133E 02	-5.215E 01	1.093E 03	2.156E 01	1.082E-02	3.967E 01	1.991E-02
3.934E 01	1.437E 01	1.446E 01	-5.305E 02	-2.771E 02	-2.192E 02	-5.795E 01	1.131E 03	3.848E 01	1.931E-02	3.873E 01	1.944E-02
3.950E 01	1.730E 01	1.376E 01	-5.384E 02	-2.827E 02	-2.221E 02	-6.062E 01	1.149E 03	4.632E 01	2.325E-02	3.685E 01	1.850E-02
3.983E 01	1.772E 01	1.225E 01	-5.565E 02	-2.952E 02	-2.289E 02	-6.629E 01	1.188E 03	4.744E 01	2.381E-02	3.280E 01	1.647E-02
4.000E 01	1.924E 01	9.284E 00	-5.666E 02	-3.016E 02	-2.325E 02	-7.457E 01	1.208E 03	4.799E 01	2.409E-02	2.486E 01	1.248E-02
4.033E 01	1.956E 01	3.275E 01	-5.958E 02	-3.148E 02	-2.402E 02	-7.567E 01	1.247E 03	5.238E 01	2.629E-02	8.769E 00	4.402E-02
4.040E 01	1.988E 01	3.287E 01	-6.026E 02	-3.174E 02	-2.418E 02	-7.567E 01	1.254E 03	5.324E 01	2.672E-02	8.801E 00	4.418E-03
4.041E 01	1.993E 01	3.289E 01	-6.035E 02	-3.178E 02	-2.420E 02	-7.585E 01	1.256E 03	5.337E 01	2.679E-02	8.806E 00	4.420E-03
4.133E 01	2.444E 01	3.457E 01	-6.703E 02	-3.694E 02	-2.659E 02	-1.034E 02	1.364E 03	6.544E 01	3.285E-02	9.256E 00	4.646E-03
4.139E 01	2.476E 01	3.469E 01	-7.107E 02	-3.740E 02	-2.678E 02	-1.062E 02	1.372E 03	6.630E 01	3.328E-02	9.288E 00	4.662E-03
4.150E 01	2.527E 01	3.822E 01	-7.224E 02	-3.816E 02	-2.708E 02	-1.109E 02	1.385E 03	6.768E 01	3.397E-02	1.023E 01	5.138E-02
4.246E 01	1.444E 01	7.048E 01	-7.850E 02	-4.638E 02	-2.999E 02	-1.640E 02	1.500E 03	3.866E 01	1.941E-02	1.887E 01	9.474E-03
4.411E 01	1.659E 01	1.261E 01	-8.111E 02	-6.250E 02	-3.493E 02	-2.757E 02	1.700E 03	4.441E 01	2.229E-02	3.376E 01	1.695E-02
4.431E 01	1.684E 01	1.231E 01	-8.139E 02	-6.440E 02	-3.548E 02	-2.892E 02	1.743E 03	4.509E 01	2.263E-02	3.296E 01	1.555E-02
4.480E 01	1.747E 01	1.150E 01	-8.262E 02	-6.897E 02	-3.683E 02	-3.213E 02	1.783E 03	4.679E 01	2.349E-02	3.096E 01	1.554E-02
4.483E 01	1.746E 01	1.151E 01	-8.230E 02	-6.923E 02	-3.692E 02	-3.232E 02	1.787E 03	4.674E 01	2.346E-02	3.083E 01	1.548E-02
4.626E 01	1.652E 01	9.326E 01	-8.365E 02	-8.132E 02	-4.064E 02	-4.068E 02	1.963E 03	4.422E 01	2.220E-02	2.497E 01	1.253E-02
4.731E 01	1.582E 01	7.719E 01	-8.387E 02	-8.960E 02	-4.319E 02	-4.641E 02	2.093E 03	4.237E 01	2.127E-02	2.067E 01	1.037E-02
4.735E 01	1.554E 01	7.650E 01	-8.395E 02	-8.995E 02	-4.330E 02	-4.665E 02	2.098E 03	4.160E 01	2.088E-02	2.048E 01	1.028E-02
4.811E 01	1.069E 01	9.026E 01	-8.262E 02	-9.570E 02	-4.504E 02	-5.066E 02	2.193E 03	2.862E 01	1.436E-02	2.417E 01	1.213E-02
4.880E 01	1.029E 01	1.029E 01	-7.945E 02	-1.007E 03	-4.656E 02	-5.414E 02	2.279E 03	2.756E 01	1.383E-02	2.756E 01	1.383E-02
4.933E 01	1.126E 01	1.126E 01	-7.647E 02	-1.043E 03	-4.769E 02	-5.666E 02	2.346E 03	3.015E 01	1.513E-02	3.015E 01	1.513E-02
5.074E 01	4.650E 00	6.075E 00	-7.059E 02	-1.128E 03	-5.048E 02	-6.231E 02	2.524E 03	1.245E 01	6.250E-03	1.245E 01	6.250E-03
5.284E 01	6.075E 00	5.862E 00	-6.469E 02	-1.230E 03	-5.415E 02	-6.887E 02	2.799E 03	1.627E 01	8.165E-03	1.627E 01	8.165E-03
5.334E 01	5.862E 00	5.862E 00	-6.314E 02	-1.252E 03	-5.493E 02	-7.030E 02	2.834E 03	1.570E 01	7.880E-03	1.570E 01	7.880E-03
5.409E 01	5.242E 00	5.242E 00	-6.099E 02	-1.284E 03	-5.605E 02	-7.231E 02	2.949E 03	1.404E 01	7.045E-03	1.404E 01	7.045E-03
5.485E 01	4.612E 00	4.612E 00	-5.908E 02	-1.313E 03	-5.710E 02	-7.417E 02	3.047E 03	1.335E 01	6.200E-03	1.235E 01	6.200E-03
5.576E 01	3.772E 00	3.772E 00	-5.718E 02	-1.344E 03	-5.825E 02	-7.612E 02	3.163E 03	1.010E 01	5.070E-03	1.010E 01	5.070E-03
5.628E 01	3.290E 00	3.290E 00	-5.361E 02	-1.359E 03	-5.883E 02	-7.712E 02	3.209E 03	8.810E 00	4.422E-03	8.810E 00	4.422E-03
5.633E 01	3.239E 00	3.239E 00	-5.352E 02	-1.361E 03	-5.888E 02	-7.722E 02	3.234E 03	4.318E 00	2.167E-03	8.673E 00	4.353E-03
5.647E 01	1.612E 00	3.109E 00	-5.331E 02	-1.365E 03	-5.901E 02	-7.747E 02	3.234E 03	4.318E 00	2.167E-03	8.325E 00	4.179E-03
5.655E 01	3.035E 00	3.035E 00	-5.319E 02	-1.374E 03	-5.909E 02	-7.761E 02	3.244E 03	8.126E 00	4.079E-03	8.126E 00	4.079E-03
5.683E 01	2.775E 00	2.775E 00	-5.281E 02	-1.374E 03	-5.935E 02	-7.809E 02	3.280E 03	7.431E 00	3.730E-03	7.431E 00	3.730E-03
5.706E 01	2.680E 00	2.680E 00	-5.254E 02	-1.380E 03	-5.955E 02	-7.847E 02	3.309E 03	7.176E 00	3.602E-03	7.176E 00	3.602E-03
5.778E 01	2.375E 00	2.375E 00	-5.186E 02	-1.398E 03	-6.015E 02	-7.964E 02	3.402E 03	6.360E 00	3.192E-03	6.360E 00	3.192E-03
5.880E 01	3.600E 00	3.600E 00	-5.116E 02	-1.422E 03	-6.087E 02	-8.136E 02	3.532E 03	9.640E 00	4.839E-03	9.640E 00	4.839E-03
6.081E 01	2.325E 00	2.325E 00	-5.110E 02	-1.464E 03	-6.195E 02	-8.446E 02	3.790E 03	6.226E 00	3.125E-03	6.226E 00	3.125E-03
6.223E 01	1.394E 00	1.394E 00	-5.110E 02	-1.489E 03	-6.259E 02	-8.631E 02	3.972E 03	3.732E 00	1.873E-03	3.732E 00	1.873E-03



XABS	P-IB	P-OB	PDA	GOX	0-IB	0-OB	CAWALL	P-IB/PS0	P-IB/PT0	P-OB/PS0	P-OB/PT0
6.470E 01	3.439E 00	3.439E 00	-5.110E 02	-1.535E 03	-6.381E 02	-8.973E 02	4.289E 03	9.208E 00	4.622E-03	9.208E 00	4.622E-03
6.507E 01	4.500E 00	3.751E 00	-5.110E 02	-1.543E 03	-6.401E 02	-9.028E 02	4.337E 03	1.205E 01	6.048E-03	1.004E 01	5.041E-03
6.511E 01	4.500E 00	3.784E 00	-5.110E 02	-1.544E 03	-6.403E 02	-9.034E 02	4.342E 03	1.205E 01	6.048E-03	1.013E 01	5.086E-03
6.531E 01	4.213E 00	3.950E 00	-5.110E 02	-1.548E 03	-6.414E 02	-9.064E 02	4.368E 03	1.128E 01	5.663E-03	1.058E 01	5.309E-03
6.697E 01	1.830E 00	2.270E 00	-4.767E 02	-1.575E 03	-6.486E 02	-9.268E 02	4.583E 03	4.900E 00	2.460E-03	6.078E 00	3.051E-03
6.764E 01	1.772E 00	3.187E 00	-4.310E 02	-1.584E 03	-6.509E 02	-9.332E 02	4.665E 03	4.744E 00	2.382E-03	8.535E 00	4.284E-03
6.841E 01	1.705E 00	2.636E 00	-3.687E 02	-1.594E 03	-6.531E 02	-9.409E 02	4.760E 03	4.565E 00	2.292E-03	7.058E 00	3.543E-03
6.913E 01	1.526E 00	2.120E 00	-3.178E 02	-1.604E 03	-6.549E 02	-9.494E 02	4.848E 03	4.087E 00	2.052E-03	5.677E 00	2.849E-03
6.974E 01	1.375E 00	1.938E 00	-2.805E 02	-1.614E 03	-6.562E 02	-9.574E 02	4.922E 03	3.682E 00	1.848E-03	5.190E 00	2.605E-03
7.069E 01	1.182E 00	1.655E 00	-2.322E 02	-1.629E 03	-6.581E 02	-9.706E 02	5.036E 03	3.166E 00	1.589E-03	4.432E 00	2.224E-03
7.112E 01	1.095E 00	1.597E 00	-2.129E 02	-1.635E 03	-6.589E 02	-9.763E 02	5.088E 03	2.932E 00	1.472E-03	4.276E 00	2.146E-03
7.265E 01	8.901E-01	1.390E 00	-1.549E 02	-1.653E 03	-6.612E 02	-9.915E 02	5.273E 03	2.383E 00	1.195E-03	3.722E 00	1.868E-03
7.280E 01	8.700E-01	1.277E 00	-1.502E 02	-1.654E 03	-6.614E 02	-9.927E 02	5.290E 03	2.330E 00	1.169E-03	3.421E 00	1.717E-03
7.355E 01	8.610E-01	7.150E-01	-1.167E 02	-1.662E 03	-6.623E 02	-9.995E 02	5.374E 03	2.305E 00	1.157E-03	1.915E 00	9.610E-04
7.488E 01	8.609E-01	7.120E-01	-9.864E 01	-1.677E 03	-6.636E 02	-1.014E 03	5.426E 03	2.263E 00	1.136E-03	1.906E 00	9.570E-04
7.773E 01	8.450E-01	0.000	-6.585E 01	-1.679E 03	-6.657E 02	-1.014E 03	5.525E 03	2.129E 00	1.069E-03	0.000	0.000
8.163E 01	7.950E-01	0.000	-3.272E 01	-1.691E 03	-6.675E 02	-1.014E 03	5.630E 03	2.022E 00	1.015E-03	0.000	0.000
8.444E 01	6.850E-01	0.000	-1.673E 01	-1.683E 03	-6.688E 02	-1.014E 03	5.684E 03	1.834E 00	9.207E-04	0.000	0.000
8.730E 01	8.500E-01	0.000	1.794E 00	-1.685E 03	-6.713E 02	-1.014E 03	5.707E 03	2.276E 00	1.142E-03	0.000	0.000
8.731E 01	8.503E-01	0.000	1.800E 00	-1.685E 03	-6.713E 02	-1.014E 03	5.707E 03	2.277E 00	1.143E-03	0.000	0.000

READING = 0052 BLOCK = 69 TIME = 165.929 MACH 0.0 PT = 743.999 IT = 2090.2

X	DDRAG	CDRAG	CF	HC
4.040E 01	1.125E 02	1.125E 02	2.205E-03	4.317E-02
4.041E 01	1.729E-01	1.127E 02	2.206E-03	4.319E-02
4.133E 01	1.601E 01	1.287E 02	2.335E-03	4.659E-02
4.139E 01	1.142E 00	1.298E 02	2.343E-03	4.684E-02
4.150E 01	1.854E 00	1.317E 02	2.357E-03	4.721E-02
4.246E 01	1.684E 01	1.485E 02	2.430E-03	4.870E-02
4.411E 01	2.850E 01	1.770E 02	2.472E-03	4.792E-02
4.431E 01	3.298E 00	1.803E 02	2.478E-03	4.800E-02
4.480E 01	8.289E 00	1.886E 02	2.493E-03	4.816E-02
4.483E 01	5.028E-01	1.891E 02	2.494E-03	4.816E-02
4.626E 01	2.353E 01	2.126E 02	2.525E-03	4.605E-02
4.731E 01	1.627E 01	2.289E 02	2.538E-03	4.308E-02
4.735E 01	6.673E-01	2.296E 02	2.539E-03	4.302E-02
4.811E 01	1.092E 01	2.405E 02	2.534E-03	4.002E-02
4.880E 01	9.355E 00	2.499E 02	2.508E-03	3.619E-02
4.933E 01	6.643E 00	2.565E 02	2.481E-03	3.335E-02
5.074E 01	1.593E 01	2.724E 02	2.432E-03	2.764E-02
5.284E 01	2.004E 01	2.925E 02	2.381E-03	2.200E-02
5.334E 01	4.237E 00	2.967E 02	2.366E-03	2.093E-02
5.409E 01	6.056E 00	3.028E 02	2.346E-03	1.950E-02
5.485E 01	5.807E 00	3.086E 02	2.328E-03	1.825E-02
5.576E 01	6.537E 00	3.151E 02	2.311E-03	1.698E-02
5.628E 01	2.268E 00	3.174E 02	2.264E-03	1.330E-02
5.633E 01	3.065E-01	3.177E 02	2.263E-03	1.325E-02
5.647E 01	7.691E-01	3.184E 02	2.261E-03	1.314E-02
5.655E 01	4.432E-01	3.189E 02	2.255E-03	1.325E-02
5.683E 01	1.548E 00	3.204E 02	2.248E-03	1.317E-02
5.706E 01	1.246E 00	3.217E 02	2.244E-03	1.311E-02
5.778E 01	3.961E 00	3.256E 02	2.236E-03	1.284E-02
5.880E 01	5.511E 00	3.312E 02	2.227E-03	1.270E-02
6.081E 01	1.098E 01	3.421E 02	2.227E-03	1.315E-02
6.223E 01	7.964E 00	3.501E 02	2.226E-03	1.351E-02
6.470E 01	1.366E 01	3.638E 02	2.257E-03	1.301E-02
6.507E 01	1.975E 00	3.657E 02	2.283E-03	1.225E-02
6.511E 01	2.011E-01	3.659E 02	2.293E-03	1.183E-02
6.531E 01	9.881E-01	3.669E 02	2.289E-03	1.170E-02
6.697E 01	6.819E 00	3.737E 02	2.158E-03	6.973E-03
6.764E 01	2.186E 00	3.759E 02	2.190E-03	8.039E-03
6.841E 01	2.576E 00	3.785E 02	2.162E-03	7.259E-03
6.913E 01	2.164E 00	3.807E 02	2.128E-03	6.350E-03
6.974E 01	1.667E 00	3.823E 02	2.108E-03	5.897E-03
7.069E 01	2.371E 00	3.847E 02	2.076E-03	5.230E-03
7.112E 01	1.005E 00	3.857E 02	2.066E-03	5.022E-03
7.265E 01	3.311E 00	3.890E 02	2.035E-03	4.418E-03
7.280E 01	2.867E-01	3.893E 02	2.024E-03	4.219E-03
7.355E 01	1.244E 00	3.906E 02	1.970E-03	3.326E-03
7.356E 01	2.133E-03	3.906E 02	1.969E-03	3.321E-03
7.488E 01	6.990E-01	3.913E 02	1.976E-03	3.499E-03
7.773E 01	1.323E 00	3.926E 02	1.956E-03	3.322E-03
8.163E 01	1.352E 00	3.939E 02	1.934E-03	3.171E-03
8.444E 01	6.643E-01	3.946E 02	1.909E-03	2.929E-03
8.730E 01	2.868E-01	3.949E 02	1.936E-03	3.438E-03
8.731E 01	0.000	3.949E 02	1.936E-03	3.439E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... (LBF)  
 MEASURED THRUST..... -402. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... -402. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... (LBF-SEC/LBM)  
 MEASURED THRUST COEFFICIENT..... -1648  
 MEASURED THRUST COEFFICIENT..... -1648

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 0. (LBF)  
 NET THRUST..... 0. (LBF)  
 SPECIFIC IMPULSE..... 0. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.0000

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 112.5 (LBF)  
 INLET MOMENTUM CHANGE..... -715.1 (LBF)  
 COMBUSTOR FRICTION DRAG..... 253.2 (LBF)  
 COMBUSTOR STRUT DRAG..... 8.98 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... -171. (LBF)  
 NOZZLE FRICTION DRAG..... 29.15 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 484. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 513. (LBF)  
 EXTERNAL FRICTION DRAG..... 59.99 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -955. (LBF)  
 TOTAL EXTERNAL DRAG..... -1015. (LBF)  
 TOTAL STRUT DRAG..... 8.98 (LBF)  
 CAVITY FORCE..... -1159. (LBF)  
 CALCULATED LOAD CELL FORCE..... -2576. (LBF)  
 MEASURED LOAD CELL FORCE..... -2624. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9901  
 ADDITIVE DRAG COEFFICIENT..... 0.0000  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1603  
 DELTA PT2..... 0.1167 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3840  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1626  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8925  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9048  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9423  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8931  
 ENTHALPY AT P0 - SUPERSONIC..... -9.65 (BTU/LBM)  
 ENTHALPY AT P0 - SUBSONIC..... 23.50 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0000  
 EQUIVALENCE RATIO..... 0.000  
 COMBUSTOR EFFICIENCY..... 0.000  
 TOTAL PRESSURE RATIO..... 0.2391  
 COMBUSTOR EFFECTIVENESS..... 0.6733  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS..... 1.0025  
 NOZZLE COEFFICIENT - CT..... 0.5601  
 PROCESS EFFICIENCY..... 1.0472  
 KINETIC ENERGY EFFICIENCY..... 1.0051

## STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3348 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.219 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.559 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.311 (IN)  
 STRUT LEADING EDGE..... 56.475 (IN)  
 STRUT TRAILING EDGE..... 65.075 (IN)  
 COMBUSTOR EXIT..... 65.075 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.320	
1C	44.300	
2A	48.795	
2C	46.250	
3A	54.085	
3B	56.270	
4	44.820	

Reading 52

$t = 172.23 \text{ sec.}$



READING = 0052 BLOCK = 76 TIME = 172.229 MACH 6.0 PI = 740.004 TI = 3035.0

COMPUTATION	P	T	R	CALPHA	WELT	SNAP	MACH	VFL	S	X/A	A/LAC	WORTH	C	YEAR	PAT	STAR
46.250	117.275	2003	647.61	81.8	1.3120	23.772	2673									
46.250	23.878	1757	360.61	543	1.3027	23.772	2221	1.706	3789	2.235	0.85591	27.121	0.1237	3951	50.403	145.7 0.50 0.02
COMPUTOR	0	20	13	21												
46.260	120.634	2563	647.51	405	1.3143	23.736	2656									
46.260	23.870	1715	360.61	510	1.3029	23.735	2194	1.724	3749	2.224	0.85531	27.121	0.1238	3951	50.365	145.7 0.50 0.00
COMPUTOR	0	21	14	21												
47.310	118.356	2541	641.91	708	1.3151	23.730	2646									
47.310	23.045	1692	355.11	512	1.3459	23.730	2104	1.734	3708	2.226	0.79586	27.121	0.1330	3978	46.808	146.7 0.50 0.00
COMPUTOR	0	22	15	21												
47.341	118.356	2540	641.71	707	1.3151	23.729	2645									
47.341	22.943	1689	354.51	511	1.3460	23.729	2103	1.737	3791	2.226	0.79461	27.121	0.1333	3979	46.814	146.7 0.50 0.00
COMPUTOR	0	23	16	21												
48.110	112.153	2580	637.91	810	1.3131	23.776	2662									
48.110	19.626	1678	331.91	506	1.3062	23.776	2171	1.402	3912	2.236	0.74156	27.121	0.1428	4016	45.088	148.1 0.50 0.02
COMPUTOR	0	24	17	3												
48.791	114.205	2541	634.81	707	1.3148	23.748	2644									
48.791	17.766	1597	317.21	481	1.3501	23.748	2125	1.476	3945	2.229	0.68138	27.121	0.1554	4066	42.200	149.9 0.50 0.01
COMPUTOR	0	25	18	3												
49.321	110.304	2569	632.71	806	1.3134	23.780	2656									
49.321	16.337	1597	305.41	480	1.3498	23.780	2123	1.907	4047	2.235	0.63725	27.121	0.1662	4107	40.079	151.4 0.50 0.02
COMPUTOR	0	26	19	21												
50.731	114.052	2504	627.91	786	1.3161	23.737	2629									
50.731	10.600	1375	291.01	410	1.3615	23.737	1980	2.193	4342	2.225	0.50311	27.121	0.1950	4190	36.652	154.5 0.50 0.00
COMPUTOR	0	27	20	4												
52.831	89.546	2693	621.81	807	1.3074	23.924	2708									
52.831	10.575	1589	248.91	476	1.3486	23.924	2110	2.047	4320	2.266	0.44514	27.121	0.2379	4286	29.883	158.0 0.50 0.08
COMPUTOR	0	28	21	4												
53.331	98.252	2604	620.51	818	1.3114	23.805	2669									
53.331	8.892	1426	226.71	425	1.3577	23.805	2009	2.209	4439	2.248	0.42695	27.121	0.2440	4306	29.452	158.8 0.50 0.04
COMPUTOR	0	29	22	4												
54.041	78.230	2812	618.81	846	1.3018	24.045	2751									
54.041	10.249	1714	244.51	515	1.3414	24.045	2180	1.984	4326	2.288	0.40245	27.121	0.2631	4337	27.055	159.4 0.50 0.14
COMPUTOR	0	30	23	4												
54.841	65.406	3034	616.21	941	1.2913	24.247	2833									
54.841	11.625	2017	262.81	611	1.3267	24.247	2341	1.796	4205	2.322	0.38058	27.121	0.2742	4373	24.873	161.3 0.50 0.23
COMPUTOR	0	31	24	5												
55.760	52.386	3459	613.21	1104	1.2895	24.708	2973									
55.760	15.047	2623	309.41	810	1.2895	24.714	2619	1.489	3899	2.370	0.35748	27.121	0.2962	4428	21.661	163.3 0.50 0.41
COMPUTOR	0	32	25	5												
56.264	41.245	4236	611.51	1371	1.2179	25.581	3166									
56.264	16.915	3586	341.21	1134	1.2493	25.641	2907	1.248	3677	2.426	0.28778	27.121	0.3679	4694	16.446	173.1 0.50 0.77
COMPUTOR	0	33	26	4												
56.321	41.070	4167	611.31	1347	1.2232	25.501	3153									
56.321	15.741	3455	321.41	1048	1.2566	25.553	2907	1.310	3809	2.422	0.28692	27.121	0.3691	4698	16.942	173.2 0.50 0.74
COMPUTOR	0	34	27	3												
56.461	41.456	4210	610.81	1342	1.2199	25.552	3161									
56.461	16.001	3517	325.41	1110	1.2530	25.611	2925	1.292	3779	2.425	0.28491	27.121	0.3717	4709	16.733	173.6 0.50 0.76
COMPUTOR	0	35	28	4												
56.541	41.076	4324	610.41	1403	1.2107	25.694	3184									
56.541	17.936	3727	352.91	1183	1.2404	25.767	2987	1.202	3590	2.429	0.28810	27.121	0.3675	4715	16.074	173.8 0.50 0.82
COMPUTOR	0	36	29	4												
56.821	40.807	4416	609.61	1433	1.2034	25.803	3201									
56.821	18.975	3865	365.91	1230	1.2312	25.889	3023	1.155	3492	2.432	0.28719	27.121	0.3647	4735	15.545	174.6 0.50 0.87
COMPUTOR	0	37	30	2												
57.047	41.044	4416	608.81	1433	1.2039	25.805	3200									
57.047	18.345	3836	353.11	1220	1.2327	25.894	3013	1.187	3576	2.431	0.28660	27.121	0.3695	4750	15.929	175.2 0.50 0.87

	P	T	H	GAMMA	MOLWT	SONV	MACH	VFL	S	W/A	W/M/P	TUAC	PHI	FTAC
COMBUSTOR	0	30	31	4										
57.771	41.338	4373	606.3(1418)	1.2073	25.761	3192								
57.771	16.325	3656	314.8(1170)	1.2408	25.868	2970	1.286	3819	2.429	0.25218	27.121	0.3753	4768	16.745 176.5 0.50 0.95
COMBUSTOR	0	39	32	4										
58.791	40.666	4567	602.9(1445)	1.1916	26.008	3225								
58.791	18.675	4020	308.2(1243)	1.2184	26.130	3053	1.169	3570	2.434	0.28036	27.121	0.3777	4815	15.552 177.6 0.50 0.97
COMBUSTOR	0	40	33	4										
60.801	42.753	4413	586.9(1431)	1.2042	25.837	3198								
60.801	17.178	3737	311.1(1191)	1.2367	25.931	2985	1.267	3782	2.426	0.29012	27.121	0.3650	4793	17.051 176.7 0.50 0.88
COMBUSTOR	0	41	34	4										
62.221	42.898	4480	592.9(1455)	1.1989	25.931	3209								
62.221	19.375	3913	337.9(1245)	1.2268	26.032	3028	1.180	3572	2.427	0.29798	27.121	0.3553	4774	16.942 176.0 0.50 0.93
COMBUSTOR	0	42	35	4										
64.688	40.408	4413	583.8(1431)	1.2031	25.871	3194								
64.688	18.095	3837	331.8(1219)	1.2318	25.961	3009	1.185	3565	2.429	0.29245	27.121	0.3749	4743	18.649 174.9 0.50 0.90
COMBUSTOR	0	43	36	3										
65.061	37.363	4424	584.7(1435)	1.2011	25.890	3195								
65.061	17.256	3874	336.9(1232)	1.2289	25.963	3018	1.162	3506	2.435	0.29259	27.121	0.4032	4738	14.308 174.7 0.50 0.91
COMBUSTOR	0	44	37	4										
65.061	37.363	4424	584.7(1435)	1.2011	25.890	3195								
65.061	19.498	4103	438.6(1316)	1.2181	25.948	3091	1.068	3291	2.450	0.29259	27.121	0.4032	4768	13.430 176.8 0.50 0.91
NOZZLE	AE	45	38	5										
87.297	37.363	4424	584.7(1435)	1.2011	25.890	3195								
87.297	1.008	2140	-293.1( 628)	1.3021	26.028	2307	2.873	6628	2.435	0.03466	27.121	1.9371	6107	5.630 225.2 0.50 0.91
NOZZLE	PO	46	39	5										
87.297	37.363	4424	584.7(1435)	1.2011	25.890	3195								
87.297	0.394	1697	-435.7( 446)	1.3216	26.088	2070	3.453	7146	2.435	0.02792	27.121	3.7842	6406	3.107 236.2 0.50 0.91
NOZZLE	AE	47	40	5										
87.297	37.363	4561	655.1(1446)	1.1926	25.841	3235								
87.297	1.091	2265	-251.9( 669)	1.2973	26.028	2368	2.844	6737	2.450	0.03446	27.121	1.9371	6220	5.723 229.3 0.50 0.91
NOZZLE	PO	48	41	5										
87.297	37.363	4561	655.1(1446)	1.1926	25.841	3235								
87.297	0.394	1783	-408.5( 513)	1.3174	26.028	2118	3.444	7295	2.450	0.02718	27.121	3.8984	6543	3.082 241.3 0.50 0.91
FICTIVE	COMBUSTOR	68	61	0										
65.061	297.554	4661	584.7(1518)	1.2080	26.173	3270								
65.061	0.394	1073	-702.6( 246)	1.3568	26.285	1660	4.836	8026	2.279	0.03017	27.121	2.1107	6979	6.257 257.3 0.50 1.00
FICTIVE	NOZZLE	69	62	0										
87.297	19.591	4375	571.6(1417)	1.1961	25.871	3171								
87.297	1.460	2689	-121.3( 769)	1.2839	26.027	2548	2.311	5889	2.461	0.03466	27.121	1.9371	5688	3.002 209.7 0.50 0.91

ORIGINAL PAGE IS  
OF POOR QUALITY





XARS	P-18	P-08	PDA	RUX	WIR	QNR	CA-ALL	D-IMP/PS0	F-IR/PTD	P-08/PS0	P-08/PTD
5.8792 01	1.8672 01	1.8672 01	1.5062 02	-2.301F 03	-9.364E 02	-1.343E 03	1.532E 03	4.735E 01	2.507E-02	4.735E 01	2.507E-02
6.0602 01	1.7172 01	1.548E 02	-2.403E 03	-9.712E 02	-1.492E 03	1.790E 03	3.790E 03	4.354E 01	2.303E-02	4.354E 01	2.303E-02
6.2228 01	1.9372 01	1.548E 02	-2.511E 03	-9.534E 02	-1.578E 03	3.972E 03	3.972E 03	4.912E 01	2.601E-02	4.912E 01	2.601E-02
6.4682 01	1.8092 01	1.548E 02	-2.765E 03	-1.039E 03	-1.727E 03	4.269E 03	4.269E 03	4.588E 01	2.429E-02	4.588E 01	2.429E-02
6.504E 01	1.7902 01	1.548E 02	-2.796E 03	-1.046E 03	-1.750E 03	4.337E 03	4.337E 03	4.212E 01	2.233E-02	4.534E 01	2.403E-02
6.510E 01	1.788E 01	1.548E 02	-2.799E 03	-1.047E 03	-1.752E 03	4.342E 03	4.342E 03	4.212E 01	2.233E-02	4.534E 01	2.403E-02
6.530E 01	1.579E 01	1.548E 02	-2.814E 03	-1.051E 03	-1.763E 03	4.368E 03	4.368E 03	4.001E 01	2.119E-02	4.534E 01	2.368E-02
6.694E 01	6.940E 00	2.931E 02	-2.914E 03	-1.078E 03	-1.836E 03	4.583E 03	4.583E 03	2.267E 01	1.200E-02	1.830E 01	9.691E-03
6.763E 01	6.532E 00	4.427E 02	-2.941E 03	-1.086E 03	-1.856E 03	4.665E 03	4.665E 03	1.656E 01	8.768E-03	1.732E 01	9.171E-03
6.840E 01	3.765E 00	5.981E 02	-2.969E 03	-1.093E 03	-1.876E 03	4.760E 03	4.760E 03	9.545E 00	5.055E-03	1.366E 01	7.338E-03
6.912E 01	3.002E 00	7.029E 02	-2.994E 03	-1.099E 03	-1.895E 03	4.848E 03	4.848E 03	7.610E 00	4.029E-03	1.062E 01	5.624E-03
6.973E 01	2.355E 00	7.726E 02	-3.013E 03	-1.103E 03	-1.910E 03	4.922E 03	4.922E 03	5.971E 00	3.161E-03	8.908E 00	4.716E-03
7.068E 01	1.766E 00	8.510E 02	-3.041E 03	-1.108E 03	-1.933E 03	5.036E 03	5.036E 03	4.478E 00	2.371E-03	6.237E 00	3.302E-03
7.111E 01	1.500E 00	8.799E 02	-3.062E 03	-1.110E 03	-1.942E 03	5.088E 03	5.088E 03	3.803E 00	2.013E-03	5.908E 00	3.124E-03
7.264E 01	9.809E-01	9.570E 02	-3.084E 03	-1.115E 03	-1.969E 03	5.273E 03	5.273E 03	2.487E 00	1.317E-03	4.703E 00	2.402E-03
7.279E 01	9.300E-01	9.427E 02	-3.101E 03	-1.117E 03	-1.971E 03	5.290E 03	5.290E 03	2.358E 00	1.248E-03	4.221E 00	2.235E-03
7.354E 01	9.228E-01	9.497E 02	-3.101E 03	-1.117E 03	-1.971E 03	5.374E 03	5.374E 03	2.340E 00	1.239E-03	1.813E 00	9.597E-04
7.354E 01	9.228E-01	9.497E 02	-3.101E 03	-1.117E 03	-1.971E 03	5.374E 03	5.374E 03	2.340E 00	1.239E-03	1.813E 00	9.597E-04
7.487E 01	9.100E-01	1.001E 03	-3.110E 03	-1.121E 03	-2.010E 03	5.426E 03	5.426E 03	2.339E 00	1.231E-03	1.800E 00	9.589E-04
7.772E 01	1.100E 00	1.020E 03	-3.135E 03	-1.125E 03	-2.010E 03	5.525E 03	5.525E 03	2.307E 00	1.477E-03	0.000	0.000
8.162E 01	8.300E-01	1.102E 03	-3.139E 03	-1.129E 03	-2.010E 03	5.630E 03	5.630E 03	2.789E 00	1.114E-03	0.000	0.000
8.443E 01	8.300E-01	1.120E 03	-3.142E 03	-1.132E 03	-2.010E 03	5.684E 03	5.684E 03	2.104E 00	1.114E-03	0.000	0.000
8.729E 01	1.149E 00	1.149E 03	-3.147E 03	-1.137E 03	-2.010E 03	5.707E 03	5.707E 03	2.992E 00	1.584E-03	0.000	0.000
8.730E 01	1.181E 00	1.149E 03	-3.147E 03	-1.137E 03	-2.010E 03	5.707E 03	5.707E 03	2.992E 00	1.584E-03	0.000	0.000

ORIGINAL PAGE IS  
OF POOR QUALITY

HPALTAG = 0052 PLUCK = 7A TIME = 172.229 MACH 6.0 PI = 740.999 TI = 3035.0

X	HPALAG	CURAG	CF	HC
4.040E 01	1.147E 02	1.147E 02	2.213E-03	0.339E-02
4.041E 01	1.931E-01	1.149E 02	2.543E-03	3.476E-02
4.131E 01	1.871E-01	1.330E 02	2.675E-03	4.152E-02
4.132E 01	1.966E-01	1.334E 02	2.429E-03	4.448E-02
4.134E 01	1.224E 00	1.350E 02	2.397E-03	4.536E-02
4.150E 01	2.229E 00	1.372E 02	2.408E-03	4.702E-02
4.246E 01	1.768E 01	1.549E 02	2.489E-03	4.971E-02
4.410E 01	3.034E 01	1.852E 02	2.808E-03	5.317E-02
4.431E 01	3.712E 00	1.890E 02	2.578E-03	5.718E-02
4.480E 01	8.325E 00	1.973E 02	2.577E-03	5.861E-02
4.481E 01	1.033E-01	1.974E 02	2.826E-03	5.418E-02
4.482E 01	1.863E-01	1.976E 02	2.826E-03	5.418E-02
4.625E 01	2.580E 01	2.234E 02	2.792E-03	5.337E-02
4.626E 01	1.749E-01	2.235E 02	2.792E-03	5.337E-02
4.731E 01	1.695E 01	2.405E 02	2.505E-03	5.519E-02
4.734E 01	4.566E-01	2.410E 02	2.508E-03	5.511E-02
4.811E 01	1.119E 01	2.921E 02	2.521E-03	4.965E-02
4.879E 01	9.379E 00	2.615E 02	2.522E-03	4.554E-02
4.932E 01	6.821E 00	2.685E 02	2.466E-03	4.312E-02
5.073E 01	1.654E 01	3.056E 02	2.391E-03	3.144E-02
5.243E 01	2.072E 01	3.126E 02	2.286E-03	3.081E-02
5.333E 01	4.456E 00	3.101E 02	2.427E-03	2.590E-02
5.408E 01	6.472E 00	3.165E 02	2.354E-03	2.875E-02
5.444E 01	6.166E 00	3.227E 02	2.522E-03	2.927E-02
5.576E 01	7.183E 00	3.299E 02	2.703E-03	3.185E-02
5.632E 01	2.409E 00	3.328E 02	2.870E-03	2.972E-02
5.644E 01	3.554E-01	3.326E 02	3.166E-03	2.568E-02
5.654E 01	9.445E-01	3.336E 02	3.139E-03	2.808E-02
5.672E 01	5.372E-01	3.341E 02	3.260E-03	2.834E-02
5.682E 01	1.828E 00	3.360E 02	3.214E-03	2.736E-02
5.702E 01	1.468E 00	3.372E 02	3.229E-03	2.802E-02
5.777E 01	4.856E 00	3.423E 02	3.184E-03	2.570E-02
5.879E 01	6.731E 00	3.490E 02	3.189E-03	2.720E-02
6.080E 01	1.349E 01	3.625E 02	3.228E-03	2.804E-02
6.222E 01	9.813E 00	3.723E 02	3.186E-03	2.796E-02
6.468E 01	1.634E 01	3.886E 02	3.237E-03	2.611E-02
6.506E 01	2.347E 00	3.910E 02	3.260E-03	2.886E-02
6.510E 01	2.425E-01	3.912E 02	3.341E-03	2.542E-02
6.530E 01	1.232E 00	3.925E 02	3.335E-03	2.520E-02
6.696E 01	1.016E 01	4.026E 02	3.191E-03	1.757E-02
6.763E 01	3.649E 00	4.063E 02	3.159E-03	1.503E-02
6.840E 01	3.803E 00	4.101E 02	3.098E-03	1.225E-02
6.912E 01	3.077E 00	4.131E 02	3.050E-03	1.030E-02
6.973E 01	2.314E 00	4.155E 02	3.024E-03	8.913E-03
7.068E 01	3.105E 00	4.186E 02	2.972E-03	7.011E-03
7.111E 01	1.248E 00	4.198E 02	2.954E-03	6.511E-03
7.264E 01	3.936E 00	4.237E 02	2.906E-03	5.149E-03
7.279E 01	3.263E-01	4.241E 02	2.822E-03	4.850E-03
7.354E 01	1.356E 00	4.254E 02	2.819E-03	3.400E-03
7.354E 01	2.221E-03	4.254E 02	2.819E-03	3.392E-03
7.447E 01	7.354E-01	4.262E 02	2.824E-03	3.640E-03
7.772E 01	1.528E 00	4.277E 02	2.843E-03	4.236E-03
8.162E 01	1.579E 00	4.293E 02	2.782E-03	3.344E-03
8.443E 01	7.432E-01	4.300E 02	2.769E-03	3.368E-03
8.732E 01	3.460E-01	4.304E 02	2.810E-03	4.397E-03
8.730E 01	0.000	4.304E 02	2.810E-03	4.399E-03

RECEIVED 11 FEB 1964

ANGLE OF ATTACK.....	0.000 (DEGREES)
MASS FLOW RATE.....	0.4812
ADAPTIVE DRAG COEFFICIENT.....	0.0004
LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1636
DELTA PT2.....	0.1179 (PSI)
TOTAL PRESSURE RECOVERY - SUPERSONIC.....	0.1994
TOTAL PRESSURE RECOVERY - SUBSONIC.....	0.1660
INLET PROCESS EFFICIENCY - SUPERSONIC.....	0.8946
INLET PROCESS EFFICIENCY - SUBSONIC.....	0.9042
KINETIC ENERGY EFFICIENCY - SUPERSONIC.....	0.9426
KINETIC ENERGY EFFICIENCY - SUBSONIC.....	0.8915
ENTHALPY AT PO - SUPERSONIC.....	-1.70 (BTU/LBM)
ENTHALPY AT PO - SUBSONIC.....	34.54 (BTU/LBM)

INLET PROCESS EFFICIENCY = SUPERSONIC.....	0.6946
INLET PROCESS EFFICIENCY = SUBSONIC.....	0.9042
KINETIC ENERGY EFFICIENCY = SUPERSONIC....	0.9426
KINETIC ENERGY EFFICIENCY = SUBSONIC.....	0.8915
ENTHALPY AT PO = SUPERSONIC.....	1.70 (BTU/LBM)
ENTHALPY AT PO = SUBSONIC.....	34.54 (BTU/LBM)

KINETIC ENERGY EFFICIENCY - SUPERSONIC.....	0.9426
KINETIC ENERGY EFFICIENCY - SUBSONIC.....	0.8915
ENTHALPY AT PO - SUPERSONIC.....	-1.70 (BTU/LBM)
ENTHALPY AT PO - SUBSONIC.....	34.53 (BTU/LBM)

FUEL-AIR RATIO.....	0.0168
EQUIVALENCE RATIO.....	0.502
COMBUSTOR EFFICIENCY.....	0.908
TOTAL PRESSURE RATIO.....	0.126
COMBUSTOR EFFECTIVENESS.....	0.750
INJECTOR RECHARGE COEFFICIENT.....	0.9369, 0.7241

FUEL-AIR RATIO.....	0.0168
EQUIVALENCE RATIO.....	0.502
COMBUSTOR EFFICIENCY.....	0.908
TOTAL PRESSURE RATIO.....	0.1256
COMBUSTOR EFFICIENCIES.....	0.7950
INJECTOR DISCHARGE COEFFICIENTS	0.9610, 0.9766, 0.9936, 0.7241

	INJECTORS	STATION	VALVE
NOMINAL COYL LEADING EDGE.....		34.884 (IN)	
SPINE TRANSLATION.....		0.320R (IN)	
INLET THROAT.....	1A	40.000 (IN)	A
COYL LEADING EDGE.....	1H	41.306 (IN)	B
NOZZLE SHROUN TRAILING EDGE.....	1C	40.300 (IN)	
NOZZLE PLUG TRAILING EDGE.....	2A	44.781 (IN)	
STRUT LEADING EDGE.....	2C	46.250 (IN)	E
STRUT TRAILING EDGE.....	3A	54.071 (IN)	
COMBUSTOR EXIT.....	3B	56.356 (IN)	
	4	40.806 (IN)	C

	INJECTORS	STATION	VALVE
NOMINAL COYL LEADING EDGE.....		34.884 (IN)	
SPINE TRANSLATION.....		0.320R (IN)	
INLET THROAT.....	1A	40.000 (IN)	A
COYL LEADING EDGE.....	1H	41.306 (IN)	B
NOZZLE SHROUN TRAILING EDGE.....	1C	40.300 (IN)	
NOZZLE PLUG TRAILING EDGE.....	2A	44.781 (IN)	
STRUT LEADING EDGE.....	2C	46.250 (IN)	E
STRUT TRAILING EDGE.....	3A	54.071 (IN)	
COMBUSTOR EXIT.....	3B	56.356 (IN)	
	4	40.806 (IN)	C

Reading 52

$t = 180.33 \text{ sec.}$

315/75

READING = 0052 HLUCK = 05 TIME = 140.329 MACH 5.9 PT = 746.499 TI = 5064.1  
JET PERFORMANCE

SUMMARY REPORT

	P	T	M	S	GAMMA	MOUNT	SONV	MACH	VFL	S	W/A	A/AC	PORTV	G	IVAL	PTI	EIAC
WIND TUNNEL	1	0	5														
0.000	746.499	3069	690.4(	615)	1.2905	28.973	2807										
0.000	0.401	423	-27.4(	101)	1.3940	28.971	1008	5.946	5993	1.834	0.10665	26.668	0.9763	5068	9.932	190.0	
SPIKE TIP NS	2	0	3														
0.600	18.037	3069	690.4(	615)	1.2903	28.971	2807										
0.600	16.223	2996	666.3(	793)	1.2926	28.971	2378	0.408	1051	2.089	0.10665	26.668	0.9763	4928	1.741	184.8	
WIND TUNNEL	3	0	0														
0.000	746.499	3069	690.4(	615)	1.2905	28.973	2807										
0.000	0.382	417	-26.8(	100)	1.3990	28.971	1000	5.947	5999	1.834	0.10302	25.760	0.9763	4899	9.604	190.2	
SPIKE TIP NS	4	0	0														
0.600	18.037	3069	690.4(	615)	1.2903	28.971	2807										
0.600	16.362	3002	670.0(	795)	1.2924	28.971	2580	0.391	1008	2.089	0.10302	25.760	0.9763	4899	1.614	190.2	
INLET THROAT	5	0	3														
40.400	319.670	3015	673.9(	799)	1.2922	28.972	2586										
40.400	15.251	1438	225.7(	354)	1.3513	28.971	1826	2.593	4736	1.887	0.94168	26.668	0.1106	4357	69.308	163.4	
INLET UPNRSK	6	0	3														
40.400	319.670	3015	673.9(	799)	1.2922	28.972	2586										
40.400	13.120	1383	211.1(	360)	1.3546	28.971	1793	2.684	4812	1.887	0.85608	26.668	0.1216	4397	64.023	164.9	
INLET DNRSK	7	0	4														
40.400	125.619	3015	673.9(	799)	1.2922	28.972	2586										
40.400	108.526	2916	643.9(	769)	1.2953	28.972	2546	0.882	1227	1.951	0.85608	26.668	0.1216	4397	16.319	164.9	
COMBUSTOR	8	0	1	21													
40.410	267.883	2970	675.8(	821)	1.2948	27.689	2630										
40.410	13.660	1434	280.9(	370)	1.3929	27.689	1868	2.554	4771	1.971	0.94509	26.768	0.1106	4356	70.070	162.7	0.11 0.07
COMBUSTOR	9	0	2	21													
41.334	193.119	2992	675.2(	825)	1.2988	26.605	2607										
41.334	20.119	1669	298.2(	451)	1.3421	26.605	2005	2.124	4343	2.044	0.94957	26.847	0.1104	4193	64.095	156.2	0.20 0.04
COMBUSTOR	10	0	3	21													
41.344	199.748	2955	675.1(	814)	1.3006	26.606	2634										
41.344	20.189	1632	299.0(	441)	1.3443	26.605	2025	2.142	4338	2.038	0.94881	26.847	0.1105	4191	64.987	156.1	0.20 0.01
COMBUSTOR	11	0	4	21													
41.409	197.115	2848	674.6(	812)	1.3009	26.600	2632										
41.409	20.643	1643	303.9(	444)	1.3438	26.600	2031	2.121	4308	2.038	0.94974	26.847	0.1104	4178	63.587	155.6	0.20 0.00
COMBUSTOR	12	0	5	2													
41.500	188.698	2864	674.3(	817)	1.3001	26.619	2637										
41.500	22.150	1702	315.7(	461)	1.3409	26.618	2068	2.052	4236	2.043	0.94955	26.847	0.1104	4161	62.505	153.0	0.20 0.02
COMBUSTOR	13	0	6	4													
42.460	133.177	3110	667.6(	891)	1.2883	26.907	2721										
42.460	32.581	2241	391.3(	619)	1.3174	26.908	2336	1.592	3718	2.089	0.94110	26.847	0.1114	4032	54.376	150.2	0.20 0.26
COMBUSTOR	14	0	7	5													
44.129	107.195	3505	652.7(	1011)	1.2680	27.407	2839										
44.129	57.882	3068	506.0(	871)	1.2834	27.411	2672	1.014	2709	2.127	0.90660	26.847	0.1156	3975	38.168	148.0	0.20 0.67
COMBUSTOR	15	0	8	2													
44.310	106.961	3497	650.9(	1008)	1.2684	27.403	2837										
44.310	58.647	3071	508.0(	872)	1.2834	27.407	2674	1.000	2674	2.126	0.90580	26.847	0.1157	3970	37.645	147.9	0.20 0.67
COMBUSTOR	16	0	9	3													
44.800	106.063	3454	645.8(	995)	1.2703	27.371	2823										
44.800	60.714	3061	514.0(	869)	1.2841	27.375	2672	0.961	2568	2.124	0.90245	26.847	0.1161	3949	36.016	147.1	0.20 0.64
COMBUSTOR	17	0	10	6													
44.834	105.803	3119	656.2(	983)	1.2885	24.960	2829										
44.834	60.530	2747	528.0(	836)	1.3010	24.961	2668	0.957	2553	2.240	0.90871	27.038	0.1162	3946	36.054	146.0	0.41 0.23
COMBUSTOR	18	0	11	2													
44.844	105.771	3120	658.1(	964)	1.2884	24.962	2830										
44.844	60.473	2747	527.7(	836)	1.3010	24.962	2668	0.957	2555	2.240	0.90834	27.038	0.1162	3947	36.062	146.0	0.41 0.23

COMPUSOR	P	T	M	GAMMA	MOLWT	SUNV	MACH	VEL	S	-/A	A/AC	PUMP	G	IVAC	PHI	ETAC
46.250	99.609	2801	19	5	650.6	( 92)	1.3003	23.222	2832			3947	36.163	145.1	0.61	0.13
46.250	52.777	2502	20	13	505.1	( 78)	1.3137	23.222	2642	1.021	2698	2.340	0.86238	27.209	0.1232	
46.260	99.580	2802	20	13	650.5	( 92)	1.3002	23.224	2832			3948	36.171	145.1	0.61	0.13
46.260	52.782	2402	21	14	504.8	( 79)	1.3136	23.224	2642	1.022	2700	2.340	0.86194	27.209	0.1232	
47.310	95.146	3016	22	15	638.7	( 98)	1.2933	23.381	2881			4040	36.032	148.5	0.61	0.19
47.310	46.974	2503	22	15	471.6	( 82)	1.3088	23.381	2671	1.083	2892	2.353	0.80160	27.209	0.1325	
47.369	94.860	3009	23	16	636.0	( 93)	1.2999	23.393	2885			4047	35.905	148.7	0.61	0.19
47.369	46.774	2513	23	16	470.1	( 82)	1.3083	23.393	2674	1.084	2899	2.357	0.79789	27.209	0.1331	
48.110	91.539	3134	24	17	630.3	(102)	1.2877	23.513	2921			4132	36.102	151.8	0.61	0.24
48.110	41.216	2612	24	17	437.0	( 84)	1.3034	23.514	2685	1.158	3110	2.368	0.74692	27.209	0.1422	
48.819	90.713	3134	25	18	624.0	(102)	1.2875	23.529	2920			4237	37.817	155.7	0.61	0.24
48.819	30.850	2404	25	18	370.7	( 78)	1.3109	23.530	2602	1.368	3560	2.368	0.68360	27.209	0.1594	
49.349	91.806	3090	26	19	619.9	(101)	1.2894	23.497	2903			4307	38.087	158.3	0.61	0.23
49.349	25.033	2202	26	19	326.2	( 72)	1.3170	23.497	2522	1.520	3833	2.362	0.63933	27.209	0.1662	
50.759	81.893	3320	27	20	610.2	(103)	1.2778	23.747	2980			4463	33.730	164.0	0.61	0.32
50.759	21.925	2403	27	20	293.1	( 78)	1.3074	23.749	2596	1.534	3983	2.389	0.54488	27.209	0.1950	
52.859	74.842	3492	28	21	597.9	(115)	1.2684	23.952	3032			4654	29.776	171.0	0.61	0.40
52.859	16.837	2508	28	21	230.1	( 78)	1.3032	23.958	2604	1.647	4290	2.407	0.44659	27.209	0.2379	
53.339	74.627	3491	29	22	595.4	(119)	1.2689	23.947	3028			4691	29.226	172.4	0.61	0.40
53.339	15.356	2406	29	22	210.2	( 73)	1.3035	23.953	2574	1.705	4390	2.406	0.42635	27.209	0.2480	
54.109	70.974	3567	30	23	591.8	(119)	1.2641	24.046	3034			4742	27.797	174.3	0.61	0.43
54.109	14.771	2523	30	23	199.6	( 79)	1.3015	24.034	2605	1.701	4430	2.415	0.40377	27.209	0.2631	
54.869	67.891	3604	31	24	588.4	(120)	1.2595	24.136	3075			4790	26.543	176.1	0.61	0.46
54.869	14.137	2588	31	24	188.5	( 82)	1.2981	24.147	2630	1.701	4473	2.423	0.38183	27.209	0.2782	
55.750	68.597	3610	32	25	584.7	(119)	1.2614	24.109	3068			4841	25.807	177.9	0.61	0.45
55.750	12.314	2473	32	25	157.8	( 78)	1.3025	24.119	2577	1.794	4622	2.419	0.35930	27.209	0.2957	
56.274	53.286	3638	33	26	582.7	(131)	1.2404	24.465	3151			4966	20.737	182.5	0.61	0.56
56.274	11.223	2848	33	26	155.8	( 90)	1.2885	24.494	2725	1.696	4622	2.457	0.28872	27.209	0.3679	
56.349	65.332	3571	34	27	582.5	(118)	1.2634	24.074	3052			4969	22.053	182.6	0.61	0.44
56.349	8.480	2282	34	27	97.2	( 70)	1.3108	24.082	2674	1.992	4928	2.421	0.28796	27.209	0.3689	
56.489	65.633	3585	35	28	582.0	(117)	1.2637	24.069	3051			4975	21.977	182.8	0.61	0.44
56.489	8.337	2206	35	28	93.4	( 70)	1.3111	24.078	2464	2.005	4945	2.420	0.28599	27.209	0.3715	
56.909	55.468	3680	36	29	581.8	(129)	1.2448	24.405	3137			4979	21.119	183.0	0.61	0.56
56.909	10.660	2700	36	29	140.2	( 80)	1.2892	24.429	2681	1.753	4701	2.451	0.28909	27.209	0.3675	
56.849	57.550	3824	37	30	580.8	(126)	1.2482	24.346	3122			4990	21.375	183.4	0.61	0.54
56.849	10.087	2616	37	30	125.3	( 84)	1.2936	24.367	2634	1.810	4774	2.445	0.28808	27.209	0.3688	
57.075	57.718	3833	38	31	580.0	(127)	1.2476	24.358	3124			4999	21.393	183.7	0.61	0.54
57.075	10.058	2600	38	31	122.3	( 85)	1.2933	24.379	2639	1.814	4786	2.445	0.28764	27.209	0.3693	

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0052 MUCK = 65 TIME = 140.329 MACM 5.9 PI = 740.499 IT = 3060.1

	P	T	H	GAMMA	MULTI	SNV	MALM	VEL	S	A/A	N	A/AC	MUMT	G	IVOC	PI	ETAC
COMBUSTOR	0	38	31	4													
57.799	57.066	3070	577.7(1286)	1.2451	24.405	3133											
57.799	9.962	2673	116.2( 846)	1.2016	24.420	2651	1.415	4405	2.444	0.28304	27.209	0.3753	5021	21.180	184.5	0.01	0.56
COMBUSTOR	0	34	34	7													
58.819	91.594	3274	574.9(1075)	1.2750	23.793	2952											
58.819	5.962	1720	20.0( 527)	1.3356	23.795	2191	2.405	5269	2.512	0.28124	27.209	0.3777	5033	23.034	185.0	0.01	0.34
COMBUSTOR	0	40	33	6													
60.829	55.048	4010	570.1(1335)	1.2357	24.580	3166											
60.829	11.275	2806	129.9( 923)	1.2813	24.616	2738	1.714	4693	2.456	0.29106	27.209	0.3850	5023	21.226	184.6	0.01	0.62
COMBUSTOR	0	41	34	5													
62.249	47.845	4490	566.6(1507)	1.1992	25.142	3263											
62.249	16.300	3721	218.2(1214)	1.2371	25.258	3010	1.387	4175	2.485	0.29695	27.209	0.3853	5015	19.399	184.3	0.01	0.84
COMBUSTOR	0	42	35	4													
64.713	43.242	4676	559.7(1373)	1.1830	25.385	3291											
64.713	18.180	4082	263.6(1344)	1.2115	25.545	3102	1.241	3849	2.496	0.29337	27.209	0.3789	5000	16.949	183.8	0.01	0.95
COMBUSTOR	0	43	36	3													
65.089	40.523	4626	558.5(1555)	1.1859	25.320	3281											
65.089	18.265	3935	250.7(1313)	1.2171	25.481	3080	1.274	3924	2.500	0.29344	27.209	0.4032	4998	16.065	183.7	0.01	0.92
COMBUSTOR	0	44	37	3													
65.089	40.523	4797	662.8(1622)	1.1756	25.233	3333											
65.089	17.760	4264	370.2(1408)	1.2005	25.424	3156	1.212	3826	2.522	0.29344	27.209	0.4032	5070	15.666	186.3	0.01	0.92
NOZZLE	45	38	5														
67.325	40.523	4626	558.5(1517)	1.1859	25.320	3281											
67.325	1.102	2301	399.9( 699)	1.2922	25.547	2406	2.879	6925	2.500	0.05484	27.209	1.9371	6404	5.902	235.3	0.01	0.92
NOZZLE	46	39	5														
67.325	40.523	4626	558.5(1517)	1.1859	25.320	3281											
67.325	0.401	1830	561.3( 536)	1.3123	25.547	2156	3.472	7486	2.500	0.08728	27.209	3.8939	6731	3.176	207.4	0.01	0.92
NOZZLE	47	40	5														
67.325	40.523	4797	662.8(1622)	1.1756	25.233	3333											
67.325	1.185	2493	336.8( 762)	1.2893	25.547	2492	2.838	7072	2.522	0.05484	27.209	1.9371	6559	6.027	241.1	0.01	0.92
NOZZLE	48	41	5														
67.325	40.523	4797	662.8(1622)	1.1756	25.233	3333											
67.325	0.401	1917	519.7( 580)	1.3085	25.547	2228	3.457	7692	2.522	0.08621	27.209	4.0329	6922	3.133	254.4	0.01	0.92
FICTIVE	49	61	0														
COMBUSTOR	49	61	0														
65.089	319.670	4876	558.5(1646)	1.1995	25.624	3364											
65.089	0.401	1160	847.9( 329)	1.3463	25.795	1736	4.832	8389	2.340	0.04846	27.209	2.1923	7320	6.317	269.6	0.01	1.00
FICTIVE	50	62	0														
NOZZLE	50	62	0														
67.325	25.529	4968	540.0(1533)	1.1828	25.315	3250											
67.325	1.374	2850	277.8( 820)	1.2701	25.546	2568	2.491	6397	2.532	0.05484	27.209	1.9371	6092	5.452	223.9	0.01	0.92

READING = 0052 BLOCK = 85 TIME = 180.329 MACH 5.9 DT = 746.499 TT = 3069.1

XAB8	P-1H	P-0H	P-D4	G-0X	W-1P	C-0H	C-AVLI	P-1H+P-0	P-1R/P-10	P-0H+P-0	P-0R/P-10
6.981E-01	9.750E-01	0.000	-4.401E-01	0.000	0.000	0.000	2.470E-02	2.429E-00	1.304E-03	0.000	0.000
1.636E-01	9.750E-01	0.000	-3.250E-01	0.000	0.000	0.000	1.634E-02	2.429E-00	1.304E-03	0.000	0.000
3.070E-01	2.045E-00	0.000	-1.549E-02	0.000	0.000	0.000	5.053E-02	5.096E-00	3.739E-03	0.000	0.000
3.508E-01	3.667E-00	0.000	-3.465E-02	0.000	0.000	0.000	6.804E-02	9.635E-00	5.180E-03	0.000	0.000
3.521E-01	3.905E-00	5.951E-00	-4.169E-02	0.000	0.000	0.000	6.869E-02	9.731E-00	5.232E-03	1.483E-01	7.972E-03
3.523E-01	3.907E-00	5.912E-00	-4.170E-02	0.000	0.000	0.000	6.872E-02	9.735E-00	5.234E-03	1.471E-01	7.920E-03
3.535E-01	3.990E-00	5.950E-00	-4.233E-02	0.000	0.000	0.000	7.190E-02	9.942E-00	5.345E-03	9.554E-00	5.136E-03
3.590E-01	3.918E-00	1.550E-00	-4.403E-02	0.000	0.000	0.000	7.544E-02	9.763E-00	5.249E-03	3.862E-00	2.076E-03
3.606E-01	3.685E-00	3.152E-00	-4.489E-02	0.000	0.000	0.000	7.710E-02	9.661E-00	5.204E-03	7.657E-00	4.222E-03
3.648E-01	4.164E-00	7.324E-00	-4.609E-02	0.000	0.000	0.000	8.145E-02	1.043E-01	5.604E-03	1.825E-01	9.811E-03
3.701E-01	4.240E-00	1.259E-01	-4.667E-02	0.000	0.000	-1.774E-01	8.706E-02	1.057E-01	5.600E-03	3.137E-01	1.686E-02
3.704E-01	4.245E-00	1.247E-01	-4.671E-02	0.000	0.000	-1.830E-01	8.737E-02	1.058E-01	5.685E-03	3.208E-01	1.725E-02
3.736E-01	4.303E-00	7.937E-00	-4.723E-02	0.000	0.000	-2.422E-01	9.080E-02	1.072E-01	5.769E-03	1.978E-01	1.093E-02
3.789E-01	4.399E-00	1.132E-01	-4.908E-02	0.000	0.000	-3.433E-01	9.657E-02	1.096E-01	5.893E-03	2.022E-01	1.517E-02
3.803E-01	4.425E-00	1.134E-01	-4.932E-02	0.000	0.000	-3.495E-01	9.813E-02	1.103E-01	5.925E-03	2.826E-01	1.519E-02
3.835E-01	6.010E-00	1.138E-01	-5.010E-02	0.000	0.000	-4.340E-01	1.020E-03	1.498E-01	6.051E-03	2.836E-01	1.545E-02
3.875E-01	7.698E-00	1.442E-01	-5.096E-02	0.000	0.000	-5.222E-01	1.062E-03	1.918E-01	1.031E-02	3.593E-01	1.931E-02
3.885E-01	8.147E-00	1.522E-01	-5.108E-02	0.000	0.000	-5.202E-01	1.074E-03	2.030E-01	1.091E-02	3.794E-01	2.002E-02
3.901E-01	8.880E-00	1.528E-01	-5.109E-02	0.000	0.000	-5.496E-01	1.092E-03	2.213E-01	1.198E-02	3.809E-01	2.047E-02
3.936E-01	1.514E-01	1.541E-01	-5.201E-02	0.000	0.000	-6.129E-01	1.132E-03	2.772E-01	1.288E-02	3.842E-01	2.085E-02
3.958E-01	1.767E-01	1.452E-01	-5.271E-02	0.000	0.000	-6.183E-01	1.148E-03	4.404E-01	1.365E-02	3.619E-01	1.958E-02
3.985E-01	1.613E-01	1.232E-01	-5.462E-02	0.000	0.000	-7.000E-01	1.169E-03	4.517E-01	1.428E-02	3.071E-01	1.651E-02
4.000E-01	1.432E-01	9.595E-01	-5.559E-02	0.000	0.000	-7.263E-01	1.207E-03	4.565E-01	1.454E-02	2.391E-01	1.285E-02
4.035E-01	2.316E-01	3.300E-00	-5.697E-02	0.000	0.000	-7.866E-01	1.248E-03	5.772E-01	1.310E-02	8.225E-00	4.421E-03
4.040E-01	2.388E-01	3.309E-00	-5.697E-02	0.000	0.000	-7.866E-01	1.254E-03	5.944E-01	1.319E-02	8.235E-00	4.421E-03
4.041E-01	2.401E-01	3.306E-00	-5.697E-02	0.000	0.000	-7.866E-01	1.255E-03	5.944E-01	1.319E-02	8.235E-00	4.421E-03
4.043E-01	3.684E-01	3.396E-00	-7.422E-02	0.000	0.000	-1.258E-02	1.364E-03	9.180E-01	4.935E-02	8.482E-00	4.589E-03
4.044E-01	3.688E-01	3.397E-00	-7.439E-02	0.000	0.000	-1.258E-02	1.365E-03	9.215E-01	4.954E-02	8.484E-00	4.589E-03
4.045E-01	3.915E-01	5.151E-00	-7.559E-02	0.000	0.000	-1.319E-02	1.373E-03	9.440E-01	5.075E-02	8.484E-00	4.589E-03
4.046E-01	4.162E-01	2.354E-01	-7.710E-02	0.000	0.000	-1.398E-02	1.384E-03	9.755E-01	5.244E-02	1.283E-01	6.000E-03
4.047E-01	4.026E-01	5.550E-01	-8.835E-02	0.000	0.000	-4.493E-02	1.499E-03	1.037E-02	6.073E-02	5.805E-01	3.153E-02
4.048E-01	4.229E-01	5.500E-01	-9.181E-02	0.000	0.000	-5.110E-02	1.723E-03	1.592E-02	8.344E-02	1.371E-02	7.388E-02
4.050E-01	6.776E-01	5.367E-01	-9.320E-02	0.000	0.000	-5.940E-02	1.782E-03	1.689E-02	9.077E-02	1.337E-02	7.169E-02
4.051E-01	6.749E-01	5.357E-01	-9.341E-02	0.000	0.000	-5.936E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.052E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.053E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.054E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.055E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.056E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.057E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.058E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.059E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.060E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.061E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.062E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.063E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.064E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.065E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.066E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.067E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.068E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.069E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.070E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.071E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.072E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.073E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.074E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.075E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.076E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.077E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.078E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.079E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.080E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.081E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.082E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.083E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.084E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.085E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.086E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.087E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.088E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.089E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.090E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02
4.091E-01	6.740E-01	5.355E-01	-9.335E-02	0.000	0.000	-5.933E-02	1.788E-03	1.680E-02	9.025E-02	1.334E-02	7.173E-02



XAMS	P-JH	P-DR	P-DA	QUA	WEIR	G-GB	CASALL	P-TH/PS0	P-TH/PT0	P-DR/PS0	P-DR/PT0
5.882E 01	5.902E 00	5.945E 00	3.250E 02	-3.820E 03	-1.849E 03	-1.977E 03	3.532E 03	1.486E 01	7.987E-03	1.486E 01	7.987E-03
6.083E 01	1.127E 01	1.127E 01	3.271E 02	-3.957E 03	-1.898E 03	-2.059E 03	3.790E 03	2.809E 01	1.510E-02	2.809E 01	1.510E-02
6.225E 01	1.630E 01	1.630E 01	3.271E 02	-4.052E 03	-1.929E 03	-2.123E 03	3.972E 03	4.061E 01	2.164E-02	4.062E 01	2.164E-02
6.471E 01	1.818E 01	1.818E 01	3.271E 02	-4.241E 03	-1.994E 03	-2.247E 03	4.289E 03	4.530E 01	2.435E-02	4.530E 01	2.435E-02
6.509E 01	1.406E 01	1.847E 01	3.271E 02	-4.273E 03	-2.005E 03	-2.249E 03	4.537E 03	3.502E 01	1.894E-02	4.602E 01	2.478E-02
6.513E 01	1.406E 01	1.850E 01	3.271E 02	-4.277E 03	-2.006E 03	-2.271E 03	4.534E 03	3.506E 01	1.884E-02	4.604E 01	2.478E-02
6.532E 01	1.368E 01	1.855E 01	3.271E 02	-4.244E 03	-2.012E 03	-2.282E 03	4.536E 03	3.408E 01	1.832E-02	4.607E 01	2.498E-02
6.699E 01	1.048E 01	7.365E 00	4.678E 02	-4.612E 03	-2.034E 03	-2.358E 03	4.583E 03	2.611E 01	1.404E-02	1.834E 01	9.859E-03
6.764E 01	7.804E 00	8.017E 00	6.333E 02	-4.951E 03	-2.068E 03	-2.384E 03	4.665E 03	1.943E 01	1.045E-02	1.998E 01	1.074E-02
6.843E 01	4.730E 00	6.536E 00	8.289E 02	-4.744E 03	-2.081E 03	-2.413E 03	4.760E 03	1.179E 01	6.336E-03	1.632E 01	8.755E-03
6.915E 01	3.696E 00	5.150E 00	9.535E 02	-4.532E 03	-2.091E 03	-2.441E 03	4.844E 03	9.219E 00	4.951E-03	1.231E 01	6.899E-03
6.976E 01	2.820E 00	4.264E 00	1.039E 03	-4.563E 03	-2.098E 03	-2.465E 03	4.922E 03	7.021E 00	3.778E-03	1.063E 01	5.712E-03
7.071E 01	1.994E 00	2.885E 00	1.132E 03	-4.606E 03	-2.106E 03	-2.500E 03	5.036E 03	4.968E 00	2.671E-03	7.189E 00	3.665E-03
7.114E 01	1.620E 00	2.652E 00	1.142E 03	-4.624E 03	-2.109E 03	-2.514E 03	5.088E 03	4.037E 00	2.178E-03	6.609E 00	3.553E-03
7.267E 01	1.078E 00	1.825E 00	1.277E 03	-4.669E 03	-2.118E 03	-2.551E 03	5.273E 03	2.686E 00	1.444E-03	4.848E 00	2.445E-03
7.282E 01	1.025E 00	1.639E 00	1.253E 03	-4.673E 03	-2.119E 03	-2.554E 03	5.290E 03	2.559E 00	1.371E-03	4.084E 00	2.196E-03
7.357E 01	1.021E 00	7.100E-01	1.291E 03	-4.692E 03	-2.123E 03	-2.570E 03	5.374E 03	2.595E 00	1.368E-03	1.769E 00	9.511E-04
7.490E 01	1.015E 00	7.050E-01	1.292E 03	-4.692E 03	-2.123E 03	-2.570E 03	5.374E 03	2.595E 00	1.368E-03	1.769E 00	9.511E-04
7.779E 01	1.315E 00	0.000	1.314E 03	-4.730E 03	-2.128E 03	-2.602E 03	5.426E 03	2.529E 00	1.360E-03	0.000	0.000
8.145E 01	1.080E 00	0.000	1.506E 03	-4.740E 03	-2.138E 03	-2.602E 03	5.525E 03	3.277E 00	1.762E-03	0.000	0.000
8.446E 01	9.750E-01	0.000	1.412E 03	-4.750E 03	-2.149E 03	-2.602E 03	5.630E 03	2.691E 00	1.847E-03	0.000	0.000
8.732E 01	1.510E 00	0.000	1.834E 03	-4.759E 03	-2.157E 03	-2.602E 03	5.684E 03	3.428E 00	1.536E-03	0.000	0.000
8.732E 01	1.511E 00	0.000	1.842E 03	-4.774E 03	-2.172E 03	-2.602E 03	5.707E 03	3.763E 00	2.023E-03	0.000	0.000
8.732E 01	1.511E 00	0.000	1.864E 03	-4.774E 03	-2.172E 03	-2.602E 03	5.707E 03	3.765E 00	2.024E-03	0.000	0.000

READING = 0052 HLOCK = 05 TIME = 100.320 MAGN 5.9 PI = 740.000 TI = 3009.1

X	UDRAG	CURAG	CF	HC
4.040E 01	1.192E 02	1.192E 02	2.167E-03	4.268E-02
4.041E 01	1.905E-01	1.193E 02	2.072E-03	3.612E-02
4.043E 01	1.857E 01	1.379E 02	2.596E-03	4.924E-02
4.045E 01	1.877E-01	1.381E 02	2.017E-03	5.149E-02
4.047E 01	1.185E 00	1.393E 02	2.399E-03	5.301E-02
4.049E 01	1.600E 00	1.409E 02	2.415E-03	5.532E-02
4.051E 01	1.608E 01	1.576E 02	2.555E-03	6.654E-02
4.053E 01	2.533E 01	1.829E 02	2.866E-03	7.561E-02
4.055E 01	2.468E 00	1.854E 02	3.050E-03	7.055E-02
4.057E 01	6.724E 00	1.921E 02	3.056E-03	7.005E-02
4.059E 01	4.696E-01	1.926E 02	3.235E-03	6.847E-02
4.061E 01	1.364E-01	1.927E 02	3.969E-03	7.861E-02
4.063E 01	1.897E 01	2.117E 02	3.114E-03	6.874E-02
4.065E 01	1.352E-01	2.119E 02	2.887E-03	7.455E-02
4.067E 01	1.342E 01	2.253E 02	2.822E-03	7.164E-02
4.069E 01	7.565E-01	2.260E 02	2.899E-03	6.954E-02
4.071E 01	9.568E 00	2.358E 02	2.854E-03	6.834E-02
4.073E 01	9.307E 00	2.408E 02	2.825E-03	5.727E-02
4.075E 01	7.068E 00	2.520E 02	2.778E-03	5.116E-02
4.077E 01	1.738E 01	2.693E 02	2.674E-03	4.691E-02
4.079E 01	2.271E 01	2.921E 02	2.698E-03	3.780E-02
4.081E 01	5.148E 00	2.972E 02	2.780E-03	3.448E-02
4.083E 01	7.557E 00	3.048E 02	2.752E-03	3.340E-02
4.085E 01	7.315E 00	3.121E 02	2.778E-03	3.180E-02
4.087E 01	8.342E 00	3.204E 02	2.766E-03	2.863E-02
4.089E 01	3.069E 00	3.238E 02	2.786E-03	2.803E-02
4.091E 01	4.255E-01	3.239E 02	2.860E-03	2.045E-02
4.093E 01	1.071E 00	3.250E 02	2.645E-03	2.146E-02
4.095E 01	6.466E-01	3.256E 02	3.219E-03	2.116E-02
4.097E 01	2.289E 00	3.279E 02	2.821E-03	2.310E-02
4.099E 01	1.725E 00	3.296E 02	2.784E-03	2.327E-02
4.101E 01	5.474E 00	3.351E 02	2.774E-03	2.308E-02
4.103E 01	7.993E 00	3.431E 02	2.763E-03	1.626E-02
4.105E 01	1.493E 01	3.580E 02	2.469E-03	2.758E-02
4.107E 01	9.970E 00	3.680E 02	2.919E-03	2.941E-02
4.109E 01	1.748E 01	3.855E 02	3.165E-03	2.838E-02
4.111E 01	2.561E 00	3.881E 02	3.266E-03	2.562E-02
4.113E 01	2.718E-01	3.883E 02	3.322E-03	2.636E-02
4.115E 01	1.370E 00	3.897E 02	3.320E-03	2.644E-02
4.117E 01	1.115E 01	4.008E 02	3.213E-03	1.933E-02
4.119E 01	4.004E 00	4.048E 02	3.192E-03	1.795E-02
4.121E 01	4.278E 00	4.091E 02	3.139E-03	1.442E-02
4.123E 01	3.515E 00	4.126E 02	3.102E-03	1.223E-02
4.125E 01	2.653E 00	4.133E 02	3.070E-03	1.046E-02
4.127E 01	3.518E 00	4.188E 02	3.015E-03	7.984E-03
4.129E 01	1.387E 00	4.202E 02	2.996E-03	7.237E-03
4.131E 01	4.232E 00	4.244E 02	2.939E-03	5.404E-03
4.133E 01	3.414E-01	4.248E 02	2.926E-03	5.061E-03
4.135E 01	1.431E 00	4.262E 02	2.861E-03	3.625E-03
4.137E 01	2.367E-03	4.262E 02	2.660E-03	3.616E-03
4.139E 01	7.979E-01	4.262E 02	2.876E-03	4.090E-03
4.141E 01	1.721E 00	4.267E 02	2.898E-03	4.964E-03
4.143E 01	4.366E 00	4.366E 02	2.851E-03	4.237E-03
4.145E 01	8.746E-01	4.315E 02	2.823E-03	3.896E-03
4.147E 01	4.095E-01	4.319E 02	2.873E-03	5.425E-03
4.149E 01	0.000	4.319E 02	2.873E-03	5.426E-03

## RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1119. (LBF)  
 MEASURED THRUST..... 1035. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1861. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1908. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.4004  
 MEASURED THRUST COEFFICIENT..... 0.4147

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 6240. (LBF)  
 NET THRUST..... 1166. (LBF)  
 SPECIFIC IMPULSE..... 2194. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.4565

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 119.2 (LBF)  
 INLET MOMENTUM CHANGE..... -719.0 (LBF)  
 COMBUSTOR FRICTION DRAG..... 268.9 (LBF)  
 COMBUSTOR STRUT DRAG..... -11.18 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 641. (LBF)  
 NOZZLE FRICTION DRAG..... 43.82 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1094. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1137. (LBF)  
 EXTERNAL FRICTION DRAG..... 61.95 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -987. (LBF)  
 TOTAL EXTERNAL DRAG..... -1049. (LBF)  
 TOTAL STRUT DRAG..... -11.18 (LBF)  
 CAVITY FORCE..... -1167. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1197. (LBF)  
 MEASURED LOAD CELL FORCE..... -1161. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0. 0.0. -145.4.

## STATIONS

NOMINAL COMB. LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3884 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COMB. LEADING EDGE..... 35.233 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.573 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 67.325 (IN)  
 STRUT LEADING EDGE..... 56.489 (IN)  
 STRUT TRAILING EDGE..... 65.084 (IN)  
 COMBUSTOR EXIT..... 65.084 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.5763  
 ADIABATIC DRAG COEFFICIENT..... 0.0012  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1662  
 DELTA P/T..... 0.1177 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.4282  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1685  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.9014  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9054  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9424  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8886  
 ENTHALPY AT P0 = SUPERSONIC..... -2.44 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 36.12 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0203  
 EQUIVALENCE RATIO..... 0.607  
 COMBUSTOR EFFICIENCY..... 0.924  
 TOTAL PRESSURE RATIO..... 0.1268  
 COMBUSTOR EFFECTIVENESS..... 0.8012  
 INJECTOR DISCHARGE COEFFICIENTS..... 0.8449, 0.8573, 0.9572

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9513  
 NOZZLE COEFFICIENT = C1..... 0.8755  
 PROCESS EFFICIENCY..... 0.8881  
 KINETIC ENERGY EFFICIENCY..... 0.8909

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.334	B
1C	40.300	
2A	48.809	E
2C	46.250	
3A	50.099	
3B	56.284	
4	40.434	C

ORIGINAL PAGE IS  
OF POOR QUALITY

Reading 52

$t = 189.33 \text{ sec.}$

READING = 0052 HLOCK = 95 TIME = 180.329 MACH 6.0 PI = 746.499 TI = 2969.0  
RAMJET PERFORMANCE

3/5/75

SUMMARY REPORT

WIND TUNNEL		T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/C	PUMPH	C	IVAC	PHY	ETAC
0.000	746.499	2969	0	5	1.2936	28.972	2567						4968	9.699	186.6		
0.000	0.381	399	0	0	1.3988	28.971	981	6.003	5888	1.824	0.10600	26.728	0.9845				
0.000	0.381	399	0	0	1.2935	28.971	2567						4958	1.692	185.5		
0.000	16.338	2902	0	0	1.2937	28.971	2540	0.395	1003	2.079	0.10600	26.728	0.9845				
0.000	746.499	2969	0	0	1.2936	28.972	2567						4952	9.628	186.6		
0.000	0.381	399	0	0	1.3988	28.971	979	6.014	5889	1.824	0.10521	26.529	0.9845				
0.000	16.338	2902	0	0	1.2935	28.971	2567						4952	1.626	186.7		
0.000	16.338	2902	0	0	1.2936	28.972	2544	0.391	994	2.079	0.10521	26.529	0.9845				
0.000	16.338	2902	0	0	1.2935	28.972	2544						4316	69.040	161.5		
0.000	16.338	2902	0	0	1.3572	28.971	1767	2.666	4707	1.873	0.94342	26.728	0.1106				
0.000	337.483	2912	0	0	1.2935	28.972	2544						4354	63.714	162.9		
0.000	14.332	1340	0	0	1.2935	28.972	2544						4354	15.929	162.9		
0.000	337.483	2912	0	0	1.3604	28.971	1734	2.755	4778	1.873	0.85802	26.728	0.1216				
0.000	12.336	1286	0	0	1.2935	28.972	2544						4315	69.338	160.9	0.11	0.07
0.000	12.336	1286	0	0	1.3604	28.971	1734	2.755	4778	1.873	0.85802	26.728	0.1216				
0.000	124.765	2912	0	0	1.2935	28.972	2544						4354	15.929	162.9		
0.000	107.907	2817	0	0	1.2985	28.972	2505	0.477	1195	1.941	0.85802	26.728	0.1216				
0.000	282.551	2875	0	0	1.2978	27.747	2887						4354	63.592	154.4	0.20	0.04
0.000	13.669	1363	0	0	1.3569	27.717	1822	2.586	4711	1.933	0.94704	26.823	0.1106				
0.000	19.831	2802	0	0	1.3016	26.688	2607						4353	69.448	154.4	0.20	0.01
0.000	19.831	2802	0	0	1.3457	26.688	1999	2.151	4300	2.029	0.95161	26.904	0.1104				
0.000	203.128	2758	0	0	1.3037	26.642	2590						4140	63.104	153.4	0.20	0.00
0.000	20.252	1565	0	0	1.3476	26.642	1984	2.150	4266	2.023	0.95177	26.904	0.1104				
0.000	186.789	2812	0	0	1.3012	26.701	2610						4123	61.934	153.2	0.20	0.05
0.000	21.987	1670	0	0	1.3419	26.701	2643	2.080	4188	2.035	0.95159	26.904	0.1104				
0.000	119.276	3272	0	0	1.2792	27.232	2764						3987	49.590	148.2	0.20	0.50
0.000	40.579	2566	0	0	1.3031	27.234	2470	1.370	3383	2.102	0.94311	26.904	0.1114				
0.000	107.492	3355	0	0	1.2744	27.360	2766						3940	31.771	146.4	0.20	0.63
0.000	69.503	3050	0	0	1.2849	27.382	2668	0.844	2250	2.112	0.90854	26.904	0.1156				
0.000	107.466	3341	0	0	1.2750	27.371	2782						3939	31.357	146.4	0.20	0.62
0.000	70.189	3044	0	0	1.2852	27.373	2666	0.834	2223	2.111	0.90774	26.904	0.1157				
0.000	107.300	3287	0	0	1.2774	27.327	2764						3931	30.044	146.1	0.20	0.58
0.000	73.042	3011	0	0	1.2869	27.328	2655	0.805	2138	2.107	0.90439	26.904	0.1161				
0.000	107.145	2908	0	0	1.2977	24.479	2768						3929	30.094	144.8	0.45	0.16
0.000	71.858	2650	0	0	1.3063	24.480	2652	0.801	2123	2.244	0.91199	27.135	0.1162				
0.000	107.116	2910	0	0	1.2976	24.482	2769						3930	30.109	144.8	0.45	0.16
0.000	71.803	2652	0	0	1.3062	24.482	2652	0.801	2125	2.244	0.91161	27.135	0.1162				

REACTING = 0052 HUNCK = 45 TIME = 189.329 MACH 0.0 PT = 746.499 TT = 2969.0

	P	T	H	GAUSS	MOLWT	SUNV	MACH	VEL	S	W/A	A/C	MOTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	5												
46.250	101.069	2716	632.0( 917)	1.3076	22.280	2615										
46.250	64.132	2437	527.5( 813)	1.3172	22.280	2676	0.854	2287	2.390	0.86771	27.377	0.1232	3970	30.801	145.0	0.73 0.10
COMBUSTOR	0	20	13	2												
46.260	101.060	2719	631.9( 918)	1.3077	22.282	2816										
46.260	64.077	2439	527.2( 814)	1.3171	22.283	2677	0.855	2289	2.390	0.86726	27.377	0.1232	3971	30.857	145.0	0.73 0.10
COMBUSTOR	0	21	14	6												
47.310	96.861	2968	620.3(1006)	1.2957	22.532	2913										
47.310	58.349	2640	495.1( 883)	1.3068	22.532	2759	0.907	2503	2.418	0.80675	27.377	0.1325	4110	31.382	150.1	0.73 0.18
COMBUSTOR	0	22	15	3												
47.369	96.612	2985	619.6(1012)	1.2949	22.548	2919										
47.369	58.098	2654	493.4( 888)	1.3061	22.549	2765	0.909	2513	2.420	0.80282	27.377	0.1331	4120	31.358	150.5	0.73 0.19
COMBUSTOR	0	23	16	4												
48.110	92.750	3200	611.9(1090)	1.2848	22.765	2996										
48.110	49.993	2783	450.8( 932)	1.2967	22.766	2809	1.011	2840	2.441	0.75153	27.377	0.1422	4238	33.166	154.8	0.73 0.26
COMBUSTOR	0	24	17	4												
48.819	90.049	3306	605.5(1128)	1.2791	22.881	3031										
48.819	36.772	2704	372.4( 901)	1.2998	22.883	2763	1.236	3415	2.451	0.68782	27.377	0.1554	4370	36.508	159.6	0.73 0.30
COMBUSTOR	0	25	18	4												
49.349	91.701	3240	601.3(1104)	1.2822	22.828	3008										
49.349	28.200	2475	309.4( 817)	1.3064	22.830	2656	1.439	3822	2.444	0.64328	27.377	0.1662	4453	38.211	162.6	0.73 0.28
COMBUSTOR	0	26	19	4												
50.759	83.925	3435	591.4(1174)	1.2720	23.040	3071										
50.759	23.350	2582	261.1( 852)	1.3018	23.044	2693	1.510	4065	2.465	0.54825	27.377	0.1950	4625	34.635	168.9	0.73 0.35
COMBUSTOR	0	27	20	4												
52.859	76.574	3614	578.7(1239)	1.2619	23.249	3123										
52.859	17.850	2628	192.5( 866)	1.2974	23.258	2700	1.688	4396	2.483	0.44935	27.377	0.2379	4828	30.698	176.4	0.73 0.42
COMBUSTOR	0	28	21	3												
53.359	76.163	3616	576.0(1240)	1.2617	23.250	3123										
53.359	16.487	2586	173.2( 850)	1.2968	23.267	2679	1.676	4489	2.483	0.43099	27.377	0.2480	4867	30.069	177.8	0.73 0.42
COMBUSTOR	0	29	22	4												
54.109	71.905	3729	572.2(1281)	1.2551	23.381	3155										
54.109	16.047	2699	165.0( 889)	1.2932	23.394	2724	1.697	4514	2.494	0.40626	27.377	0.2631	4922	28.501	179.8	0.73 0.46
COMBUSTOR	0	30	23	4												
54.869	68.250	3836	568.5(1320)	1.2486	23.500	3183										
54.869	15.600	2807	156.3( 927)	1.2878	23.519	2764	1.643	4542	2.504	0.38418	27.377	0.2782	4976	27.116	181.8	0.73 0.50
COMBUSTOR	0	31	24	3												
55.760	68.271	3818	564.5(1340)	1.2495	23.493	3178										
55.760	13.743	2714	124.6( 893)	1.2912	23.511	2722	1.724	4692	2.503	0.36152	27.377	0.2957	5033	26.360	183.8	0.73 0.50
COMBUSTOR	0	32	25	5												
56.294	53.486	4198	562.3(1454)	1.2230	23.904	3268										
56.294	12.631	3162	122.7(1052)	1.2687	23.961	2885	1.626	4690	2.542	0.29050	27.377	0.3679	5182	21.175	189.3	0.73 0.63
COMBUSTOR	0	33	26	5												
56.349	63.170	3840	562.1(1322)	1.2477	23.522	3182										
56.349	9.783	2576	61.2( 841)	1.2956	23.542	2655	1.886	5007	2.510	0.28973	27.377	0.3689	5185	22.503	189.4	0.73 0.51
COMBUSTOR	0	34	27	2												
56.489	63.325	3837	561.6(1321)	1.2479	23.520	3182										
56.489	4.637	2563	57.2( 837)	1.2961	23.540	2649	1.897	5024	2.510	0.28775	27.377	0.3715	5192	22.465	189.6	0.73 0.51
COMBUSTOR	0	35	28	7												
56.569	55.326	4147	561.2(1435)	1.2269	23.851	3257										
56.569	12.058	3060	106.1(1015)	1.2735	23.901	2847	1.676	4772	2.536	0.29067	27.377	0.3675	5196	21.573	189.8	0.73 0.62
COMBUSTOR	0	36	29	4												
56.849	57.007	4094	560.2(1416)	1.2306	23.799	3245										
56.849	11.475	2961	90.5( 979)	1.2780	23.842	2809	1.726	4848	2.531	0.28986	27.377	0.3688	5209	21.838	190.3	0.73 0.60
COMBUSTOR	0	37	30	2												
57.075	57.421	4097	559.3(1416)	1.2305	23.802	3245										
57.075	11.368	2951	65.5( 975)	1.2783	23.845	2805	1.736	4869	2.531	0.28942	27.377	0.3693	5219	21.900	190.6	0.73 0.60

READING = 0052 BLOCK = 95 TIME = 149.329 MACH 6.0 PI = 746.499 TT = 2969.0

	P	T	M	GAMMA	MOLWT	80NV	MACH	VEL	8	M/A	W	A/AC	MOMTM	U	IVAC	PMI	ETAC
COMBUSTOR	0	30	31														
97.799	87.613	4108	536.6(1420)	1.2298	23.820	3247											
57.799	11.025	2939	73.4( 970)	1.2785	23.865	2798	1.757	4917	2.531	0.28443	27.377	0.3753	5244	21.766	191.5	0.73	0.61
COMBUSTOR	0	39	32														
58.819	97.906	3389	553.4(1156)	1.2733	23.088	3048											
58.819	6.150	1779	46.2( 565)	1.3318	23.092	2258	2.425	5478	2.444	0.28301	27.377	0.3777	5256	24.092	192.0	0.73	0.37
COMBUSTOR	0	40	33														
60.829	58.885	4258	587.9(1457)	1.2224	23.953	3268											
60.829	12.100	3103	81.0(1029)	1.2705	24.011	2857	1.692	4834	2.535	0.29286	27.377	0.3650	5244	21.999	191.6	0.73	0.65
COMBUSTOR	0	41	34														
62.249	48.136	4866	584.0(1702)	1.1654	24.716	3383											
62.249	19.794	4286	218.6(1468)	1.1944	24.941	3194	1.263	4035	2.568	0.30080	27.377	0.3553	5235	18.864	191.2	0.73	0.95
COMBUSTOR	0	42	35														
64.713	44.886	4915	526.2(1721)	1.1600	24.796	3387											
64.713	19.079	4404	238.3(1513)	1.1882	25.034	3218	1.206	3880	2.571	0.28512	27.377	0.3749	5220	17.191	190.7	0.73	0.99
COMBUSTOR	0	43	36														
65.089	41.944	4875	534.8(1705)	1.1659	24.752	3379											
65.089	18.028	4336	224.0(1487)	1.1885	24.986	3202	1.231	3943	2.577	0.28507	27.377	0.4032	5217	16.243	190.6	0.73	0.97
COMBUSTOR	0	44	37														
65.089	41.944	4996	627.5(1756)	1.1595	24.640	3419											
65.089	19.314	4519	331.8(1861)	1.1781	24.899	3258	1.181	3849	2.596	0.28507	27.377	0.4032	5270	18.854	192.5	0.73	0.97
NOZZLE	0	45	38														
67.325	41.944	4875	534.8(1662)	1.1659	24.752	3379											
67.325	1.224	2611	511.1( 628)	1.2753	25.152	2566	2.820	7234	2.577	0.05518	27.377	1.9371	6763	6.204	247.0	0.73	0.97
NOZZLE	0	46	39														
67.325	41.944	4875	534.8(1662)	1.1659	24.752	3379											
67.325	0.368	2018	721.8( 619)	1.2884	25.183	2276	3.485	7930	2.577	0.02461	27.377	4.3888	7178	3.033	242.1	0.73	0.97
NOZZLE	0	47	40														
67.325	41.944	4996	627.5(1756)	1.1595	24.640	3419											
67.325	1.280	2774	480.9( 687)	1.2691	25.151	2638	2.785	7346	2.596	0.05518	27.377	1.9371	6886	6.299	251.5	0.73	0.97
NOZZLE	0	48	41														
67.325	41.944	4996	627.5(1756)	1.1595	24.640	3419											
67.325	0.368	2130	682.8( 657)	1.2937	25.153	2334	3.470	8097	2.596	0.02381	27.377	4.4900	7333	2.996	267.8	0.73	0.97
PICITIVE	0	49	0														
65.089	337.483	5093	534.8(1748)	1.1882	25.003	3463											
65.089	0.365	1246	1012.3( 365)	1.3396	25.266	1813	4.854	8799	2.410	0.04441	27.377	2.4068	7724	6.073	282.1	0.73	1.00
PICITIVE	0	50	0														
67.325	85.086	4800	533.2(1676)	1.1619	24.728	3349											
67.325	1.583	3033	352.5( 983)	1.2581	25.147	2747	2.396	6582	2.614	0.05518	27.377	1.9371	6376	5.644	232.9	0.73	0.97

PAGE 4

READING = 0052 BLOCK = 95 TIME = 189.329 MACH 6.0 PT = 746.499 TT = 2965.0

XAB	P=IR	P=OB	P=IA	QOX	W=IR	G=OB	CANALL	P=IR/PSO	P=IR/PTO	P=OB/PSO	P=OB/PTO	P=OR/PIO
6.981E-01	9.750E-01	0.000	-4.403E-01	0.000	0.000	0.000	2.470E-02	2.534E 00	1.306E-03	0.000	1.306E-03	0.000
1.836E 01	9.750E-01	0.000	-3.250E 01	0.000	0.000	0.000	1.634E 02	2.534E 00	1.306E-03	0.000	1.306E-03	0.000
3.070E 01	2.045E 00	0.000	-1.549E 02	0.000	0.000	0.000	5.053E 02	9.315E 00	2.739E-03	0.000	2.739E-03	0.000
3.508E 01	3.879E 00	0.000	-3.499E 02	0.000	0.000	0.000	6.804E 02	1.008E 01	5.196E-03	0.000	5.196E-03	0.000
3.523E 01	3.917E 00	5.714E 00	-4.151E 02	0.000	0.000	0.000	6.869E 02	1.018E 01	5.247E-03	1.485E 01	5.247E-03	7.655E-03
3.523E 01	3.919E 00	5.677E 00	-4.151E 02	0.000	0.000	0.000	6.872E 02	1.018E 01	5.249E-03	1.475E 01	5.249E-03	7.605E-03
3.535E 01	3.711E 00	3.711E 00	-4.222E 02	0.000	0.000	0.000	7.190E 02	1.040E 01	5.386E-03	9.646E 00	5.386E-03	4.971E-03
3.890E 01	3.928E 00	1.550E 00	-4.394E 02	0.000	0.000	0.000	7.844E 02	1.021E 01	5.262E-03	4.689E 00	5.262E-03	2.076E-03
3.606E 01	4.245E 00	4.245E 00	-4.484E 02	0.000	0.000	0.000	7.145E 02	1.012E 01	5.210E-03	1.103E 01	5.210E-03	5.666E-03
3.606E 01	4.194E 00	1.126E 01	-4.484E 02	0.000	0.000	0.000	8.145E 02	1.090E 01	5.618E-03	2.972E 01	5.618E-03	1.509E-02
3.701E 01	4.285E 00	2.018E 01	-4.310E 02	0.000	0.000	0.000	8.706E 02	1.114E 01	5.740E-03	5.250E 01	5.740E-03	2.695E-02
3.704E 01	4.285E 00	2.060E 01	-4.301E 02	0.000	0.000	0.000	9.737E 02	1.114E 01	5.741E-03	5.354E 01	5.741E-03	2.760E-02
3.736E 01	4.280E 00	0.068E 00	-4.244E 02	0.000	0.000	0.000	9.080E 02	1.115E 01	5.745E-03	5.034E 01	5.745E-03	1.080E-02
3.789E 01	4.294E 00	1.138E 01	-4.440E 02	0.000	0.000	0.000	9.657E 02	1.116E 01	5.732E-03	5.950E 01	5.732E-03	1.980E-02
3.803E 01	4.295E 00	1.137E 01	-4.440E 02	0.000	0.000	0.000	9.613E 02	1.116E 01	5.734E-03	2.954E 01	5.734E-03	1.833E-02
3.803E 01	4.295E 00	1.141E 01	-4.453E 02	0.000	0.000	0.000	1.020E 03	1.156E 01	8.006E-03	2.955E 01	8.006E-03	1.526E-02
3.875E 01	7.662E 00	1.458E 01	-4.624E 02	0.000	0.000	0.000	1.062E 03	2.043E 01	1.093E-02	3.790E 01	1.093E-02	1.993E-02
3.885E 01	8.151E 00	1.542E 01	-4.635E 02	0.000	0.000	0.000	1.074E 03	2.171E 01	1.119E-02	4.009E 01	1.119E-02	2.066E-02
3.901E 01	9.190E 00	1.548E 01	-4.602E 02	0.000	0.000	0.000	1.092E 03	2.370E 01	1.236E-02	4.032E 01	1.236E-02	2.086E-02
3.936E 01	1.536E 01	1.547E 01	-4.738E 02	0.000	0.000	0.000	1.132E 03	3.990E 01	2.036E-02	4.032E 01	2.036E-02	2.073E-02
3.950E 01	1.786E 01	1.456E 01	-4.810E 02	0.000	0.000	0.000	1.148E 03	4.643E 01	2.393E-02	3.744E 01	2.393E-02	1.990E-02
3.965E 01	1.840E 01	1.230E 01	-5.077E 02	0.000	0.000	0.000	1.189E 03	4.783E 01	2.465E-02	3.177E 01	2.465E-02	1.846E-02
4.000E 01	1.864E 01	9.565E 00	-5.103E 02	0.000	0.000	0.000	1.207E 03	4.884E 01	2.497E-02	2.491E 01	2.497E-02	1.846E-02
4.035E 01	2.321E 01	3.323E 00	-5.499E 02	0.000	0.000	0.000	1.244E 03	6.032E 01	3.109E-02	8.642E 00	3.109E-02	4.854E-03
4.040E 01	3.388E 01	3.328E 00	-5.559E 02	0.000	0.000	0.000	1.254E 03	6.268E 01	3.198E-02	8.639E 00	3.198E-02	4.840E-03
4.041E 01	2.401E 01	3.330E 00	-5.530E 02	0.000	0.000	0.000	1.255E 03	6.248E 01	3.216E-02	8.639E 00	3.216E-02	4.841E-03
4.135E 01	3.612E 01	3.404E 00	-6.054E 02	0.000	0.000	0.000	1.304E 03	9.368E 01	4.837E-02	8.632E 00	4.837E-02	4.863E-03
4.135E 01	3.624E 01	3.407E 00	-6.071E 02	0.000	0.000	0.000	1.365E 03	9.412E 01	4.855E-02	8.632E 00	4.855E-02	4.864E-03
4.141E 01	3.709E 01	3.412E 00	-7.025E 02	0.000	0.000	0.000	1.373E 03	9.412E 01	4.855E-02	8.632E 00	4.855E-02	4.864E-03
4.150E 01	3.829E 01	3.627E 00	-7.299E 02	0.000	0.000	0.000	1.384E 03	9.951E 01	5.129E-02	1.463E 01	5.129E-02	7.338E-03
4.246E 01	3.224E 01	2.892E 01	-8.408E 02	0.000	0.000	0.000	1.499E 03	1.358E 02	4.986E-02	7.517E 01	4.986E-02	3.874E-02
4.431E 01	6.959E 01	6.941E 01	-8.679E 02	0.000	0.000	0.000	1.701E 03	1.809E 02	9.235E-02	1.804E 02	9.235E-02	9.235E-02
4.431E 01	7.140E 01	6.890E 01	-8.666E 02	0.000	0.000	0.000	1.723E 03	1.850E 02	9.512E-02	1.751E 02	9.512E-02	9.235E-02
4.480E 01	7.657E 01	6.751E 01	-8.693E 02	0.000	0.000	0.000	1.782E 03	1.990E 02	1.026E-01	1.755E 02	1.026E-01	9.403E-02
4.480E 01	7.637E 01	6.741E 01	-8.707E 02	0.000	0.000	0.000	1.787E 03	1.983E 02	1.026E-01	1.755E 02	1.026E-01	9.403E-02
4.480E 01	7.637E 01	6.741E 01	-8.707E 02	0.000	0.000	0.000	1.787E 03	1.983E 02	1.026E-01	1.755E 02	1.026E-01	9.403E-02
4.625E 01	6.479E 01	6.337E 01	-7.758E 02	0.000	0.000	0.000	1.961E 03	1.686E 02	8.699E-02	1.686E 02	8.699E-02	8.699E-02
4.625E 01	6.479E 01	6.337E 01	-7.758E 02	0.000	0.000	0.000	1.961E 03	1.686E 02	8.699E-02	1.686E 02	8.699E-02	8.699E-02
4.731E 01	5.631E 01	6.039E 01	-6.232E 02	0.000	0.000	0.000	2.092E 03	1.463E 02	7.543E-02	1.570E 02	7.543E-02	8.090E-02
4.731E 01	5.631E 01	6.039E 01	-6.232E 02	0.000	0.000	0.000	2.092E 03	1.463E 02	7.543E-02	1.570E 02	7.543E-02	8.090E-02
4.811E 01	5.175E 01	4.824E 01	-4.882E 02	0.000	0.000	0.000	2.192E 03	1.435E 02	6.932E-02	1.254E 02	6.932E-02	6.462E-02
4.811E 01	5.175E 01	4.824E 01	-4.882E 02	0.000	0.000	0.000	2.192E 03	1.435E 02	6.932E-02	1.254E 02	6.932E-02	6.462E-02
4.935E 01	3.820E 01	2.820E 01	-2.572E 02	0.000	0.000	0.000	2.280E 03	9.550E 01	4.926E-02	9.550E 01	4.926E-02	4.926E-02
5.076E 01	2.335E 01	2.335E 01	-6.666E 02	0.000	0.000	0.000	2.524E 03	7.330E 01	3.778E-02	7.330E 01	3.778E-02	3.778E-02
5.236E 01	1.785E 01	1.785E 01	-1.602E 02	0.000	0.000	0.000	2.791E 03	4.639E 01	2.391E-02	4.639E 01	2.391E-02	2.391E-02
5.411E 01	1.609E 01	1.609E 01	-2.677E 02	0.000	0.000	0.000	2.854E 03	4.281E 01	2.209E-02	4.281E 01	2.209E-02	2.209E-02
5.487E 01	1.560E 01	1.560E 01	-3.291E 02	0.000	0.000	0.000	2.950E 03	4.171E 01	2.150E-02	4.171E 01	2.150E-02	2.150E-02
5.576E 01	1.374E 01	1.374E 01	-3.947E 02	0.000	0.000	0.000	3.162E 03	4.055E 01	2.090E-02	4.055E 01	2.090E-02	2.090E-02
5.629E 01	1.263E 01	1.263E 01	-5.403E 02	0.000	0.000	0.000	3.162E 03	3.572E 01	1.841E-02	3.572E 01	1.841E-02	1.841E-02
5.649E 01	7.050E 00	1.252E 01	-3.498E 02	0.000	0.000	0.000	3.216E 03	1.632E 01	9.404E-03	3.232E 01	9.404E-03	1.777E-02
5.657E 01	1.206E 01	1.228E 01	-5.579E 02	0.000	0.000	0.000	3.234E 03	1.632E 01	9.404E-03	3.232E 01	9.404E-03	1.777E-02
5.685E 01	1.147E 01	1.147E 01	-5.428E 02	0.000	0.000	0.000	3.244E 03	1.134E 01	1.615E-02	3.134E 01	1.615E-02	1.615E-02
5.707E 01	1.137E 01	1.137E 01	-5.761E 02	0.000	0.000	0.000	3.280E 03	2.982E 01	1.537E-02	2.982E 01	1.537E-02	1.537E-02
5.780E 01	1.102E 01	1.102E 01	-6.196E 02	0.000	0.000	0.000	3.309E 03	2.955E 01	1.523E-02	2.955E 01	1.523E-02	1.523E-02
5.780E 01	1.102E 01	1.102E 01	-6.196E 02	0.000	0.000	0.000	3.402E 03	2.866E 01	1.477E-02	2.866E 01	1.477E-02	1.477E-02



XABG	P=18	P=08	PRA	COX	W=12	R=08	CANALL	P=18/P80	P=18/P10	P=08/P80	P=08/P10
3.882E 01	6.150E 00	6.150E 00	6.395E 02	-3.945E 03	-1.941E 03	-2.043E 03	1.532E 03	1.598E 01	8.238E+03	1.598E 01	8.238E+03
6.083E 01	1.210E 01	1.210E 01	6.416E 02	-4.134E 03	-1.999E 03	-2.134E 03	3.790E 03	3.145E 01	1.621E+02	3.145E 01	1.621E+02
6.225E 01	1.979E 01	1.979E 01	6.416E 02	-4.241E 03	-2.036E 03	-2.204E 03	3.972E 03	5.145E 01	2.652E+02	5.145E 01	2.652E+02
6.471E 01	1.998E 01	1.998E 01	6.416E 02	-4.457E 03	-2.117E 03	-2.339E 03	4.289E 03	5.193E 01	2.676E+02	5.193E 01	2.676E+02
6.504E 01	1.605E 01	2.001E 01	6.416E 02	-4.494E 03	-2.131E 03	-2.363E 03	4.337E 03	5.200E 01	2.680E+02	5.200E 01	2.680E+02
6.213E 01	1.605E 01	2.001E 01	6.416E 02	-4.499E 03	-2.132E 03	-2.365E 03	4.342E 03	5.201E 01	2.150E+02	5.201E 01	2.150E+02
6.333E 01	1.549E 01	2.002E 01	6.416E 02	-4.517E 03	-2.180E 03	-2.377E 03	4.368E 03	4.026E 01	2.075E+02	4.026E 01	2.075E+02
6.499E 01	1.085E 01	7.830E 00	7.933E 02	-4.654E 03	-2.190E 03	-2.384E 03	4.503E 03	2.620E 01	1.493E+02	2.620E 01	1.493E+02
6.766E 01	8.009E 00	9.667E 00	9.774E 02	-4.701E 03	-2.206E 03	-2.495E 03	4.665E 03	2.062E 01	1.073E+02	2.062E 01	1.073E+02
6.843E 01	4.745E 00	7.379E 00	1.180E 03	-4.752E 03	-2.222E 03	-2.530E 03	4.760E 03	1.233E 01	6.356E+03	1.233E 01	6.356E+03
6.915E 01	3.673E 00	5.240E 00	1.314E 03	-4.797E 03	-2.234E 03	-2.561E 03	4.848E 03	9.547E 00	4.920E+03	9.547E 00	4.920E+03
6.976E 01	2.765E 00	4.343E 00	1.400E 03	-4.831E 03	-2.242E 03	-2.589E 03	4.922E 03	7.187E 00	3.704E+03	7.187E 00	3.704E+03
7.017E 01	2.004E 00	2.945E 00	1.494E 03	-4.870E 03	-2.252E 03	-2.627E 03	5.036E 03	5.209E 00	2.685E+03	5.209E 00	2.685E+03
7.119E 01	1.660E 00	2.705E 00	1.524E 03	-4.898E 03	-2.258E 03	-2.641E 03	5.080E 03	4.315E 00	2.224E+03	4.315E 00	2.224E+03
7.207E 01	1.109E 00	1.650E 00	1.611E 03	-4.940E 03	-2.266E 03	-2.682E 03	5.273E 03	2.882E 00	1.486E+03	2.882E 00	1.486E+03
7.282E 01	1.055E 00	1.661E 00	1.617E 03	-4.952E 03	-2.267E 03	-2.685E 03	5.290E 03	2.742E 00	1.413E+03	2.742E 00	1.413E+03
7.357E 01	1.051E 00	7.150E-01	1.656E 03	-4.974E 03	-2.272E 03	-2.702E 03	5.374E 03	2.733E 00	1.408E+03	2.733E 00	1.408E+03
7.457E 01	1.051E 00	7.100E-01	1.657E 03	-4.977E 03	-2.272E 03	-2.702E 03	5.375E 03	2.733E 00	1.408E+03	2.733E 00	1.408E+03
7.602E 01	1.045E 00	0.000	1.679E 03	-5.016E 03	-2.280E 03	-2.736E 03	5.426E 03	2.714E 00	1.400E+03	2.714E 00	1.400E+03
7.775E 01	1.300E 00	0.000	1.730E 03	-5.030E 03	-2.294E 03	-2.736E 03	5.525E 03	3.899E 00	2.009E+03	3.899E 00	2.009E+03
8.165E 01	1.270E 00	0.000	1.789E 03	-5.046E 03	-2.310E 03	-2.736E 03	5.630E 03	3.301E 00	1.701E+03	3.301E 00	1.701E+03
8.446E 01	1.010E 00	0.000	1.815E 03	-5.060E 03	-2.324E 03	-2.736E 03	5.684E 03	2.625E 00	1.353E+03	2.625E 00	1.353E+03
8.732E 01	1.610E 00	0.000	1.846E 03	-5.062E 03	-2.337E 03	-2.736E 03	5.707E 03	4.185E 00	2.157E+03	4.185E 00	2.157E+03
8.773E 01	1.611E 00	0.000	1.846E 03	-5.062E 03	-2.337E 03	-2.736E 03	5.707E 03	4.188E 00	2.196E+03	4.188E 00	2.196E+03

READING = 0052 BLOCK = 95 TIME = 189.329 MACH 6.0 PT = 746.494 TT = 2969.0

X	ORHAG	CURAG	CF	HC
4.040E 01	1.222E 02	1.222E 02	2.106E+03	4.110E+02
4.041E 01	1.848E-01	1.224E 02	2.418E+03	3.839E+02
4.133E 01	1.808E 01	1.404E 02	2.563E+03	4.881E+02
4.134E 01	1.433E-01	1.406E 02	2.372E+03	5.150E+02
4.141E 01	1.157E 00	1.418E 02	2.358E+03	5.257E+02
4.150E 01	1.602E 00	1.434E 02	2.369E+03	5.525E+02
4.152E 01	1.592E 01	1.593E 02	2.601E+03	7.358E+02
4.013E 01	2.513E 01	1.824E 02	3.030E+03	7.290E+02
4.031E 01	2.122E 00	1.846E 02	3.080E+03	7.126E+02
4.460E 01	5.657E 00	1.902E 02	3.082E+03	7.045E+02
4.483E 01	3.970E-01	1.906E 02	3.292E+03	6.836E+02
4.484E 01	1.151E-01	1.907E 02	2.975E+03	7.726E+02
4.625E 01	1.617E 01	2.069E 02	3.169E+03	7.151E+02
4.626E 01	1.167E-01	2.070E 02	2.905E+03	7.880E+02
4.731E 01	1.161E 01	2.186E 02	2.825E+03	7.848E+02
4.737E 01	6.660E-01	2.193E 02	2.956E+03	7.477E+02
4.811E 01	8.661E 00	2.280E 02	2.880E+03	7.303E+02
4.880E 01	8.880E 00	2.389E 02	2.869E+03	6.377E+02
4.935E 01	7.107E 00	2.440E 02	2.885E+03	5.522E+02
5.076E 01	1.805E 01	2.620E 02	2.730E+03	4.951E+02
5.286E 01	2.373E 01	2.857E 02	2.726E+03	4.019E+02
5.336E 01	5.360E 00	2.911E 02	2.810E+03	3.691E+02
5.411E 01	7.856E 00	2.990E 02	2.789E+03	3.598E+02
5.487E 01	7.605E 00	3.064E 02	2.827E+03	3.447E+02
5.537E 01	8.689E 00	3.153E 02	2.847E+03	3.126E+02
5.829E 01	3.182E 00	3.184E 02	2.788E+03	2.807E+02
5.835E 01	4.408E-01	3.189E 02	2.943E+03	2.746E+02
5.849E 01	1.138E 00	3.200E 02	2.742E+03	2.376E+02
5.857E 01	6.808E-01	3.207E 02	3.293E+03	2.358E+02
5.859E 01	2.400E 00	3.231E 02	2.907E+03	2.536E+02
5.707E 01	1.823E 00	3.249E 02	2.874E+03	2.541E+02
5.780E 01	5.794E 00	3.307E 02	2.850E+03	2.492E+02
5.882E 01	8.532E 00	3.332E 02	2.837E+03	1.686E+02
6.083E 01	1.581E 01	3.550E 02	2.482E+03	2.972E+02
6.252E 01	1.019E 01	3.652E 02	2.994E+03	3.348E+02
6.371E 01	1.787E 01	3.831E 02	3.276E+03	2.991E+02
6.509E 01	2.664E 00	3.857E 02	3.332E+03	2.761E+02
6.513E 01	2.803E-01	3.860E 02	3.391E+03	2.836E+02
6.533E 01	1.416E 00	3.874E 02	3.389E+03	2.821E+02
6.699E 01	1.161E 01	3.991E 02	3.291E+03	2.040E+02
6.766E 01	4.241E 00	4.033E 02	3.282E+03	1.972E+02
6.843E 01	4.564E 00	4.079E 02	3.231E+03	1.551E+02
6.915E 01	3.686E 00	4.115E 02	3.188E+03	1.258E+02
6.976E 01	2.733E 00	4.143E 02	3.158E+03	1.072E+02
7.071E 01	3.625E 00	4.179E 02	3.109E+03	8.236E+01
7.114E 01	1.435E 00	4.193E 02	3.092E+03	7.502E+01
7.267E 01	4.363E 00	4.237E 02	3.037E+03	5.587E+01
7.282E 01	3.532E-01	4.241E 02	3.025E+03	5.242E+01
7.357E 01	1.480E 00	4.256E 02	2.965E+03	3.747E+01
7.357E 01	2.449E+03	4.256E 02	2.963E+03	3.736E+01
7.490E 01	8.202E-01	4.264E 02	2.978E+03	4.259E+01
7.775E 01	1.857E 00	4.282E 02	3.016E+03	5.591E+01
8.165E 01	2.089E 00	4.303E 02	2.968E+03	4.887E+01
8.446E 01	9.546E-01	4.313E 02	2.924E+03	4.075E+01
8.722E 01	4.281E-01	4.317E 02	2.972E+03	5.803E+01
8.732E 01	0.000	4.317E 02	2.972E+03	5.806E+01

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... (LBF) 1366.  
 MEASURED THRUST..... (LBF) 1265.  
 CALCULATED SPECIFIC IMPULSE..... (LBF=SEC/LBM) 2135.  
 MEASURED SPECIFIC IMPULSE..... (LBF=SEC/LBM) 1949.  
 CALCULATED THRUST COEFFICIENT..... 0.5579  
 MEASURED THRUST COEFFICIENT..... 0.5093

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... (LBF) 6492.  
 NET THRUST..... (LBF) 1502.  
 SPECIFIC IMPULSE..... (LBF=SEC/LBM) 2314.  
 THRUST COEFFICIENT..... 0.6086

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 122.2 (LBF)  
 INLET MOMENTUM CHANGE..... -674.1 (LBF)  
 COMBUSTOR FRICTION DRAG..... 263.6 (LBF)  
 COMBUSTOR STRUT DRAG..... -7.78 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 901. (LBF)  
 NOZZLE FRICTION DRAG..... 45.97 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1159. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1205. (LBF)  
 EXTERNAL FRICTION DRAG..... 61.17 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -974. (LBF)  
 TOTAL EXTERNAL DRAG..... -1035. (LBF)  
 TOTAL STRUT DRAG..... -7.78 (LBF)  
 CAVITY FORCE..... -1196. (LBF)  
 CALCULATED LOAD CELL FORCE..... -846. (LBF)  
 MEASURED LOAD CELL FORCE..... -967. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0, 0.0, -150.6.

STATIONS

NOMINAL CONWL LEADING EDGE..... 34.989 (IN)  
 SPIKE TRANSLATION..... 0.3488 (IN)  
 INLET THROAT..... 40.400 (IN)  
 CONWL LEADING EDGE..... 35.233 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.573 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.325 (IN)  
 STRUT LEADING EDGE..... 56.489 (IN)  
 STRUT TRAILING EDGE..... 65.089 (IN)  
 COMBUSTOR EXIT..... 65.089 (IN)

INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.4845  
 ADDITIVE DRAG COEFFICIENT..... 0.0002  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1649  
 DELTA PT2..... 0.1147 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.4521  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1671  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.9073  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9069  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9480  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8881  
 ENTHALPY AT P0 - SUPERSONIC..... -11.15 (BTU/LBM)  
 ENTHALPY AT P0 - SUBSONIC..... 27.55 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO..... 0.0243  
 EQUIVALENCE RATIO..... 0.726  
 COMBUSTOR EFFICIENCY..... 0.970  
 TOTAL PRESSURE RATIO..... 0.1243  
 COMBUSTOR EFFECTIVENESS..... 0.8390  
 INJECTOR DISCHARGE COEFFICIENTS 0.8263, 0.5981, 0.7640, 0.7657

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - C0..... 0.9028  
 NOZZLE COEFFICIENT - C1..... 0.8620  
 PROCESS EFFICIENCY..... 0.8620  
 KINETIC ENERGY EFFICIENCY..... 0.8709

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.334	B
1C	44.300	
2A	48.809	
2C	46.250	E
3A	54.099	
3B	56.284	
4	44.834	C

Reading 54

$t = 156,46 \text{ sec.}$

READING = 0054 BLOCK = 06 TIME = 150.458 MACH 0.0 PT = 744.744 TT = 2958.3  
RAMJET PERFORMANCE

## SUMMARY REPORT

	P	T	M	S	MACH	VEL	S	M/A	M	A/C	MUMIN	C	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5												
0.000 744.749 2958	656.8( 782)	1.2940	28.972	2563							4975	9.655	186.3		
0.000 0.382 358	-33.3( 96)	1.3988	28.971	978	6.009	5876	1.023	0.10573	26.708	0.9863					
SPIKE TIP NS	2	0	5												
0.000 17.975 2958	656.8( 782)	1.2939	28.971	2563							4941	1.647	185.0		
0.000 16.263 2892	656.7( 762)	1.2960	28.971	2536	0.395	1003	2.079	0.10573	26.708	0.9863					
WIND TUNNEL	3	0	0												
0.000 744.749 2958	656.8( 782)	1.2940	28.972	2563							4933	9.576	186.3		
0.000 0.378 367	-33.6( 95)	1.3988	28.971	976	6.021	5870	1.023	0.10483	26.403	0.9863					
SPIKE TIP NS	4	0	0								4934	1.617	186.3		
0.000 17.975 2958	656.8( 782)	1.2939	28.971	2563											
0.000 16.296 2893	637.1( 763)	1.2960	28.972	2537	0.391	993	2.079	0.10483	26.403	0.9863					
INLET THROAT	5	0	4												
40.400 295.174 2922	655.9( 771)	1.2951	28.972	2548							4265	67.327	159.7		
40.400 15.464 1422	221.4( 350)	1.3523	28.971	1816	2.530	4609	1.003	0.93997	26.708	0.1109					
INLET UPN8K	6	0	3												
40.400 295.174 2922	655.9( 771)	1.2951	28.972	2548							4306	62.243	161.2		
40.400 13.287 1366	206.8( 336)	1.3556	28.971	1783	2.629	4607	1.003	0.85452	26.708	0.1220					
INLET DNN8K	7	0	4												
40.400 122.501 2922	655.9( 771)	1.2951	28.972	2548							4306	16.220	161.2		
40.400 105.332 2823	616.1( 742)	1.2903	28.972	2508	0.407	1221	1.943	0.85452	26.708	0.1220					
COMBUSTOR	8	1	4												
40.410 294.413 2922	655.9( 771)	1.2951	28.972	2548											
40.410 15.405 1423	221.7( 351)	1.3522	28.971	1817	2.535	4607	1.003	0.93985	26.708	0.1110					
COMBUSTOR	9	2	4												
41.328 231.285 2915	653.7( 769)	1.2954	28.972	2545							4144	64.038	155.2		
41.328 18.027 1571	261.0( 390)	1.3440	28.971	1903	2.299	4376	1.099	0.94163	26.708	0.1107					
COMBUSTOR	10	3	4												
41.393 227.644 2914	653.5( 769)	1.2954	28.972	2545							4135	63.018	154.8		
41.393 18.228 1591	223.8( 393)	1.3435	28.971	1909	2.203	4359	1.900	0.94210	26.708	0.1107					
COMBUSTOR	11	4	4												
41.500 221.608 2913	653.1( 769)	1.2954	28.972	2545							4121	63.401	154.3		
41.500 18.509 1598	268.4( 397)	1.3426	28.971	1919	2.256	4330	1.902	0.94212	26.708	0.1107					
COMBUSTOR	12	5	5												
42.440 191.748 2902	659.7( 765)	1.2958	28.972	2540							4038	60.535	151.2		
42.440 20.130 1696	292.0( 421)	1.3383	28.971	1968	2.120	4171	1.910	0.93383	26.708	0.1117					
COMBUSTOR	13	6	4												
44.113 172.192 2880	653.1( 759)	1.2965	28.972	2531							3983	56.956	149.1		
44.113 20.268 1721	301.4( 430)	1.3367	28.971	1987	2.050	4074	1.915	0.89970	26.708	0.1159					
COMBUSTOR	14	7	4												
44.310 170.686 2877	652.3( 758)	1.2966	28.972	2530							3977	56.756	148.9		
44.310 20.363 1725	302.6( 431)	1.3365	28.971	1989	2.042	4062	1.916	0.89915	26.708	0.1160					
COMBUSTOR	15	8	4												
44.800 166.139 2871	650.4( 756)	1.2968	28.972	2527							3959	56.077	148.2		
44.800 20.597 1737	306.0( 435)	1.3360	28.971	1996	2.014	4029	1.917	0.89560	26.708	0.1164					
COMBUSTOR	16	9	4												
44.828 165.874 2870	650.3( 756)	1.2968	28.972	2527							3958	56.040	148.2		
44.828 20.615 1738	306.2( 435)	1.3359	28.971	1996	2.017	4027	1.917	0.89549	26.708	0.1164					
COMBUSTOR	17	10	5												
46.260 149.442 2854	655.3( 751)	1.2973	28.972	2520							3920	51.916	146.8		
46.260 20.003 1759	312.1( 441)	1.3350	28.971	2008	1.972	3959	1.922	0.84383	26.708	0.1236					
COMBUSTOR	18	11	5												
47.310 136.717 2802	621.9( 748)	1.2977	28.972	2516							3902	47.959	146.1		
47.310 18.769 1763	313.1( 442)	1.3348	28.971	2010	1.956	3930	1.927	0.78517	26.708	0.1328					

READING = 0054 BLOCK = 66 TIME = 156.458 HACHM 6.0 PT = 744.744 TT = 295R.3

	P	T	M	S	GAMMA	MOLWT	SONV	HACH	VEL	S	N/A	M	A/AC	MUMTH	Q	IVAL	PHI	ETAC
COMBUSTOR	0	19	12	5														
47.333	136.239	2802	621.7(	748)	1.2977	28.972	2516											
47.333	18.768	1764	313.3(	442)	1.3346	28.971	2010	1.954	3928	1.928	0.78354	26.708	0.1331	3901	47.833	146.0		
COMBUSTOR	0	20	13	5														
48.110	128.687	2834	619.3(	745)	1.2979	28.972	2512											
48.110	17.308	1748	309.0(	438)	1.3355	28.971	2002	1.969	3941	1.931	0.73152	26.708	0.1425	3903	44.800	146.1		
COMBUSTOR	0	21	14	4														
48.803	123.192	2827	617.3(	743)	1.2982	28.972	2509											
48.803	15.313	1709	298.4(	427)	1.3372	28.971	1980	2.017	3995	1.933	0.67101	26.708	0.1554	3926	41.657	147.0		
COMBUSTOR	0	22	15	4														
49.333	120.362	2822	615.6(	742)	1.2983	28.972	2507											
49.333	13.829	1672	288.3(	417)	1.3390	28.972	1960	2.065	4048	1.934	0.62756	26.708	0.1662	3949	39.476	147.8		
COMBUSTOR	0	23	16	5														
50.743	112.046	2810	612.2(	739)	1.2987	28.972	2502											
50.743	11.006	1600	288.7(	397)	1.3425	28.971	1920	2.160	4146	1.938	0.53485	26.708	0.1950	3991	34.462	149.4		
COMBUSTOR	0	24	17	4														
52.843	100.790	2795	607.9(	734)	1.2992	28.972	2496											
52.843	8.415	1526	248.9(	378)	1.3464	28.971	1877	2.258	4239	1.943	0.43837	26.708	0.2379	4031	28.876	150.9		
COMBUSTOR	0	25	18	4														
53.343	99.302	2792	607.0(	733)	1.2993	28.972	2495											
53.343	7.919	1506	243.6(	372)	1.3475	28.971	1866	2.285	4264	1.944	0.42046	26.708	0.2480	4043	27.863	151.4		
COMBUSTOR	0	26	19	4														
54.093	97.149	2788	608.7(	732)	1.2994	28.972	2493											
54.093	7.272	1479	236.4(	365)	1.3490	28.971	1850	2.323	4299	1.945	0.39634	26.708	0.2631	4058	26.476	152.0		
COMBUSTOR	0	27	20	4														
54.853	94.884	2784	604.5(	731)	1.2995	28.972	2492											
54.853	6.719	1455	230.1(	359)	1.3504	28.971	1836	2.357	4328	1.946	0.37479	26.708	0.2782	4072	25.210	152.5		
COMBUSTOR	0	28	21	4														
55.760	92.279	2779	603.2(	730)	1.2997	28.972	2490											
55.760	6.173	1431	223.9(	353)	1.3517	28.971	1822	2.391	4356	1.948	0.35232	26.708	0.2960	4084	23.652	152.9		
COMBUSTOR	0	29	22	4														
56.278	80.136	2777	602.5(	729)	1.2997	28.972	2489											
56.278	4.730	1384	211.5(	340)	1.3505	28.971	1794	2.466	4423	1.957	0.28345	26.708	0.3679	4118	19.485	154.2		
COMBUSTOR	0	30	23	5														
56.333	80.036	2777	602.4(	729)	1.2997	28.972	2489											
56.333	4.711	1383	211.2(	340)	1.3506	28.971	1793	2.468	4425	1.957	0.28260	26.708	0.3680	4118	19.433	154.2		
COMBUSTOR	0	31	24	5														
56.473	79.761	2776	602.3(	729)	1.2998	28.972	2489											
56.473	4.665	1380	210.5(	339)	1.3507	28.971	1791	2.472	4428	1.957	0.28057	26.708	0.3717	4120	19.306	154.2		
COMBUSTOR	0	32	25	4														
56.553	80.852	2776	602.2(	729)	1.2998	28.972	2488											
56.553	4.712	1379	210.1(	339)	1.3508	28.971	1790	2.474	4429	1.958	0.28362	26.708	0.3674	4120	19.536	154.3		
COMBUSTOR	0	33	26	5														
56.833	81.088	2775	601.9(	728)	1.2998	28.972	2488											
56.833	4.678	1375	209.0(	338)	1.3501	28.971	1788	2.480	4434	1.956	0.28293	26.708	0.3686	4122	19.495	154.3		
COMBUSTOR	0	34	27	5														
57.059	81.215	2774	601.6(	728)	1.2998	28.972	2488											
57.059	4.654	1372	208.3(	337)	1.3503	28.971	1786	2.484	4437	1.956	0.28225	26.708	0.3695	4123	19.461	154.4		
COMBUSTOR	0	35	28	5														
57.783	80.699	2772	600.9(	727)	1.2999	28.972	2487											
57.783	4.552	1365	206.4(	335)	1.3507	28.971	1782	2.494	4443	1.956	0.27786	26.708	0.3753	4126	19.186	154.5		
COMBUSTOR	0	36	29	4														
58.803	80.741	2768	599.9(	726)	1.3000	28.972	2485											
58.803	4.498	1358	204.7(	334)	1.3501	28.971	1778	2.501	4467	1.956	0.27610	26.708	0.3777	4126	19.079	154.5		
COMBUSTOR	0	37	30	5														
60.813	61.973	2763	598.1(	725)	1.3002	28.972	2483											
60.813	4.700	1365	206.6(	335)	1.3506	28.971	1782	2.484	4426	1.954	0.28571	26.708	0.3650	4114	19.654	154.0		

READING = 0054 BLOCK = 66 TIME = 156.458 MACH 6.0 PI = 744.149 IT = 2958.3

	P	T	H	S	GAMMA	MOLWT	SONV	MALM	VEL	S	*A	"	A/AC	MOTM	Q	IVAC	PHI	ETAC
COMBUSTION	0	38	31	5														
62.233	42.442	2759	597.1	724	1.3003	28.972	2481											
62.233	4.869	1572	208.4	337	1.3552	28.971	1786	2.468	4410	1.953	0.29345	26.708	0.3553	4104	20.113	153.7		
COMBUSTION	0	39	32	4														
64.697	70.503	2753	595.2	723	1.3005	28.972	2479											
64.697	4.681	1383	211.2	340	1.3546	28.971	1793	2.445	4383	1.958	0.27816	26.708	0.3749	4088	18.947	153.1		
COMBUSTION	0	40	33	3														
65.073	70.863	2752	594.9	722	1.3006	28.972	2478											
65.073	4.360	1384	211.6	340	1.3545	28.971	1794	2.441	4379	1.963	0.25859	26.708	0.4032	4066	17.599	153.0		
NOZZLE	AE	41	34	3														
87.309	70.863	2752	594.9	722	1.3006	28.972	2478											
87.309	0.391	716	43.3	178	1.3934	28.971	1308	4.016	5254	1.963	0.05383	26.708	1.9371	4555	4.395	170.6		
NOZZLE	PO	42	35	3														
87.309	70.863	2752	594.9	722	1.3006	28.972	2478											
87.309	0.382	711	42.1	171	1.3936	28.971	1304	4.033	5259	1.963	0.05301	26.708	1.9671	4558	4.333	170.7		
FICTIVE COMBUSTION	62	59	0															
65.073	295.174	2751	594.9	723	1.3005	28.972	2478											
65.073	0.382	474	41.9	114	1.3991	28.971	1067	5.179	5525	1.865	0.08355	26.708	1.2481	4708	7.173	176.3		
FICTIVE NOZZLE	63	56	0															
87.309	87.808	2732	589.0	716	1.3012	28.972	2470											
87.309	0.350	647	26.6	155	1.3959	28.971	1245	4.261	5305	1.946	0.05383	26.708	1.9371	4576	4.438	171.4		

READING = 0034 BLOCK = 66 TIME = 156.458 MACH 6.0 PT = 744.749 TT = 2958.5

XARS	P-18	P-08	PDA	G0X	W-18	Q-08	CALL	P-18/P-08	P-18/P-10
6.981E-01	9.200E-01	0.000	-4.379E-01	0.000	0.000	0.000	2.470E-02	2.406E 00	1.235E-03
1.636E 01	9.200E-01	0.000	-3.069E 01	0.000	0.000	0.000	1.634E 02	2.406E 00	1.235E-03
3.070E 01	2.075E 00	0.000	-1.521E 02	0.000	0.000	0.000	5.053E 03	5.427E 00	5.133E-03
3.508E 01	3.623E 00	0.000	-3.432E 02	0.000	0.000	0.000	6.804E 02	9.999E 00	5.133E-03
3.521E 01	3.663E 00	5.679E 00	-4.097E 02	0.000	0.000	0.000	6.862E 02	1.010E 01	5.166E-03
3.522E 01	3.666E 00	5.641E 00	-4.098E 02	0.000	0.000	0.000	6.865E 02	1.011E 01	5.166E-03
3.555E 01	3.665E 00	3.557E 00	-4.173E 02	0.000	0.000	0.000	7.139E 02	1.037E 01	5.166E-03
3.588E 01	3.663E 00	1.475E 00	-4.339E 02	-1.450E 02	0.000	0.000	7.537E 02	1.016E 01	5.214E-03
3.606E 01	3.640E 00	2.412E 00	-4.440E 02	-1.465E 02	0.000	0.000	7.719E 02	1.004E 01	5.156E-03
3.648E 01	4.164E 00	4.631E 00	-4.632E 02	-1.501E 02	0.000	0.000	8.134E 02	1.089E 01	5.591E-03
3.701E 01	4.265E 00	7.432E 00	-4.692E 02	-1.549E 02	-1.788E 01	0.000	8.715E 02	1.116E 01	5.727E-03
3.702E 01	4.259E 00	7.500E 00	-4.659E 02	-1.549E 02	-1.788E 01	0.000	8.729E 02	1.114E 01	5.719E-03
3.734E 01	4.121E 00	7.762E 00	-4.970E 02	-1.815E 02	-2.375E 01	0.000	9.072E 02	1.078E 01	5.534E-03
3.787E 01	3.693E 00	1.092E 01	-5.126E 02	-1.968E 02	-3.375E 01	0.000	9.649E 02	1.018E 01	5.227E-03
3.803E 01	3.625E 00	1.104E 01	-5.140E 02	-2.011E 02	-3.665E 01	0.000	9.823E 02	1.000E 01	5.135E-03
3.836E 01	5.294E 00	1.129E 01	-5.183E 02	-2.112E 02	-4.277E 01	0.000	1.019E 03	1.385E 01	7.108E-03
3.875E 01	7.003E 00	1.437E 01	-5.239E 02	-2.237E 02	-4.986E 01	0.000	1.063E 03	1.832E 01	9.403E-03
3.883E 01	7.168E 00	1.502E 01	-5.239E 02	-2.237E 02	-5.137E 01	0.000	1.072E 03	1.927E 01	9.693E-03
3.901E 01	6.150E 00	1.536E 01	-5.227E 02	-2.327E 02	-5.459E 01	0.000	1.093E 03	2.132E 01	1.094E-02
3.934E 01	1.427E 01	1.599E 01	-5.285E 02	-2.452E 02	-6.063E 01	0.000	1.131E 03	3.733E 01	1.916E-02
3.950E 01	1.716E 01	1.487E 01	-5.350E 02	-2.512E 02	-6.347E 01	0.000	1.149E 03	4.489E 01	2.304E-02
3.983E 01	1.753E 01	1.250E 01	-5.512E 02	-2.682E 02	-6.937E 01	0.000	1.188E 03	4.585E 01	2.354E-02
4.000E 01	1.771E 01	9.406E 00	-5.610E 02	-2.726E 02	-7.229E 01	0.000	1.208E 03	4.633E 01	2.378E-02
4.033E 01	1.974E 01	3.250E 00	-5.897E 02	-2.875E 02	-7.804E 01	0.000	1.247E 03	5.163E 01	2.651E-02
4.040E 01	2.015E 01	3.268E 00	-5.970E 02	-2.905E 02	-7.824E 01	0.000	1.255E 03	5.270E 01	2.705E-02
4.041E 01	2.021E 01	3.271E 00	-5.980E 02	-2.912E 02	-7.982E 01	0.000	1.255E 03	5.286E 01	2.714E-02
4.033E 01	2.580E 01	3.517E 00	-7.021E 02	-3.449E 02	-1.084E 02	0.000	1.364E 03	6.748E 01	3.464E-02
4.139E 01	2.620E 01	3.534E 00	-7.094E 02	-3.551E 02	-1.144E 02	0.000	1.372E 03	6.852E 01	3.518E-02
4.150E 01	2.685E 01	3.676E 00	-7.225E 02	-3.640E 02	-1.165E 02	0.000	1.385E 03	7.023E 01	3.608E-02
4.246E 01	1.399E 01	6.933E 00	-7.676E 02	-4.556E 02	-1.724E 02	0.000	1.500E 03	8.658E 01	1.878E-02
4.311E 01	1.650E 01	1.220E 01	-8.139E 02	-6.355E 02	-2.886E 02	0.000	1.700E 03	4.317E 01	2.216E-02
4.340E 01	1.680E 01	1.192E 01	-8.170E 02	-6.546E 02	-3.086E 02	0.000	1.724E 03	4.395E 01	2.256E-02
4.400E 01	1.755E 01	1.124E 01	-8.265E 02	-7.047E 02	-3.359E 02	0.000	1.783E 03	4.590E 01	2.356E-02
4.403E 01	1.752E 01	1.120E 01	-8.271E 02	-7.075E 02	-3.377E 02	0.000	1.787E 03	4.584E 01	2.353E-02
4.426E 01	1.822E 01	1.208E 01	-8.412E 02	-7.412E 02	-4.344E 02	0.000	1.963E 03	4.242E 01	2.178E-02
4.431E 01	1.826E 01	7.767E 00	-8.426E 02	-7.427E 02	-4.338E 02	0.000	2.093E 03	3.992E 01	2.049E-02
4.435E 01	1.501E 01	7.687E 00	-8.431E 02	-7.436E 02	-4.501E 02	0.000	2.094E 03	3.926E 01	2.016E-02
4.611E 01	1.057E 01	9.059E 00	-8.294E 02	-8.100E 03	-4.721E 02	0.000	2.193E 03	2.766E 01	1.420E-02
4.680E 01	1.031E 01	1.031E 01	-7.976E 02	-8.105E 03	-4.913E 02	0.000	2.279E 03	2.698E 01	1.385E-02
4.693E 01	1.127E 01	1.127E 01	-7.678E 02	-8.109E 03	-5.084E 02	0.000	2.346E 03	2.949E 01	1.514E-02
5.074E 01	4.644E 00	4.644E 00	-7.090E 02	-1.169E 03	-5.408E 02	0.000	2.523E 03	1.215E 01	6.235E-03
5.284E 01	6.300E 00	6.300E 00	-6.407E 02	-1.302E 03	-5.871E 02	0.000	2.790E 03	1.648E 01	8.459E-03
5.334E 01	5.896E 00	5.896E 00	-6.324E 02	-1.302E 03	-5.970E 02	0.000	2.853E 03	1.542E 01	7.917E-03
5.409E 01	5.277E 00	5.277E 00	-6.112E 02	-1.364E 03	-6.112E 02	0.000	2.943E 03	1.380E 01	7.086E-03
5.455E 01	4.650E 00	4.650E 00	-5.920E 02	-1.392E 03	-6.245E 02	0.000	3.047E 03	1.216E 01	6.244E-03
5.476E 01	3.791E 00	3.791E 00	-5.728E 02	-1.432E 03	-6.322E 02	0.000	3.163E 03	9.915E 00	5.090E-03
5.628E 01	3.501E 00	3.501E 00	-5.371E 02	-1.449E 03	-6.464E 02	0.000	3.209E 03	6.633E 00	4.432E-03
5.633E 01	3.142E 00	3.142E 00	-5.362E 02	-1.451E 03	-6.471E 02	0.000	3.216E 03	4.217E 00	2.165E-03
5.647E 01	3.116E 00	3.116E 00	-5.341E 02	-1.455E 03	-6.488E 02	0.000	3.234E 03	4.217E 00	2.165E-03
5.655E 01	3.040E 00	3.040E 00	-5.329E 02	-1.458E 03	-6.497E 02	0.000	3.244E 03	7.952E 00	4.082E-03
5.683E 01	2.775E 00	2.775E 00	-5.291E 02	-1.466E 03	-6.510E 02	0.000	3.280E 03	7.258E 00	3.725E-03
5.706E 01	2.707E 00	2.707E 00	-5.264E 02	-1.471E 03	-6.555E 02	0.000	3.309E 03	7.079E 00	3.634E-03
5.776E 01	2.407E 00	2.407E 00	-5.194E 02	-1.493E 03	-6.580E 02	0.000	3.402E 03	6.506E 00	3.340E-03
5.860E 01	3.712E 00	3.712E 00	-5.123E 02	-1.520E 03	-6.730E 02	0.000	3.532E 03	9.710E 00	4.985E-03
6.081E 01	2.225E 00	2.225E 00	-5.115E 02	-1.568E 03	-6.864E 02	0.000	3.740E 03	5.819E 00	2.988E-03
6.223E 01	1.500E 00	1.500E 00	-5.115E 02	-1.544E 03	-6.937E 02	0.000	3.972E 03	3.923E 00	2.016E-03



MACH	P=18	P=08	PDA	GOX	U=18	Q=08	CANALL	P=18/P80	P=18/P10	P=08/P80	P=08/P10
6.470E 01	3.620E 00	3.620E 00	-5.115E 02	-1.645E 03	-7.091E 02	-9.360E 02	4.209E 03	9.468E 00	4.861E-03	9.468E 00	4.861E-03
6.507E 01	4.462E 00	3.904E 00	-5.115E 02	-1.653E 03	-7.116E 02	-9.418E 02	4.337E 03	1.167E 01	5.992E-03	1.031E 01	5.295E-03
6.511E 01	4.462E 00	3.478E 00	-5.115E 02	-1.654E 03	-7.119E 02	-9.424E 02	4.342E 03	1.167E 01	5.992E-03	1.040E 01	5.341E-03
6.531E 01	4.182E 00	4.150E 00	-5.115E 02	-1.659E 03	-7.132E 02	-9.455E 02	4.368E 03	1.094E 01	5.615E-03	1.085E 01	5.572E-03
6.697E 01	1.850E 00	2.370E 00	-4.763E 02	-1.602E 03	-7.225E 02	-9.673E 02	4.583E 03	4.839E 00	2.481E-03	6.192E 00	3.182E-03
6.764E 01	1.815E 00	4.425E 00	-4.235E 02	-1.700E 03	-7.255E 02	-9.743E 02	4.665E 03	4.747E 00	2.437E-03	1.197E 01	5.942E-03
6.841E 01	1.775E 00	3.226E 00	-3.495E 02	-1.711E 03	-7.283E 02	-9.828E 02	4.760E 03	4.642E 00	2.383E-03	8.436E 00	4.332E-03
6.913E 01	1.548E 00	2.105E 00	-2.948E 02	-1.733E 03	-7.306E 02	-9.920E 02	4.848E 03	4.048E 00	2.078E-03	5.508E 00	2.826E-03
6.974E 01	1.355E 00	1.913E 00	-2.570E 02	-1.733E 03	-7.324E 02	-1.001E 03	4.922E 03	3.544E 00	1.819E-03	5.004E 00	2.509E-03
7.069E 01	1.615E 00	1.615E 00	-2.101E 02	-1.749E 03	-7.347E 02	-1.014E 03	5.036E 03	3.038E 00	1.570E-03	4.224E 00	2.149E-03
7.112E 01	1.065E 00	1.544E 00	-1.918E 02	-1.756E 03	-7.357E 02	-1.020E 03	5.088E 03	2.838E 00	1.451E-03	4.038E 00	2.073E-03
7.245E 01	1.240E 00	1.240E 00	-1.351E 02	-1.775E 03	-7.386E 02	-1.036E 03	5.273E 03	2.290E 00	1.178E-03	3.374E 00	1.732E-03
7.260E 01	1.192E 00	1.192E 00	-1.306E 02	-1.776E 03	-7.388E 02	-1.037E 03	5.290E 03	2.234E 00	1.148E-03	3.119E 00	1.616E-03
7.359E 01	7.050E-01	7.050E-01	-9.970E 01	-1.784E 03	-7.399E 02	-1.045E 03	5.374E 03	2.175E 00	1.117E-03	1.844E 00	9.406E-04
7.356E 01	8.314E-01	7.024E-01	-9.834E 01	-1.785E 03	-7.399E 02	-1.045E 03	5.375E 03	2.175E 00	1.116E-03	1.837E 00	9.431E-04
7.488E 01	7.900E-01	0.000	-8.122E 01	-1.801E 03	-7.414E 02	-1.059E 03	5.426E 03	2.068E 00	1.061E-03	0.000	0.000
7.773E 01	6.150E-01	0.000	-5.312E 01	-1.804E 03	-7.441E 02	-1.059E 03	5.525E 03	1.609E 00	8.250E-04	0.000	0.000
8.163E 01	7.900E-01	0.000	-2.310E 01	-1.806E 03	-7.460E 02	-1.059E 03	5.630E 03	2.068E 00	1.061E-03	0.000	0.000
8.444E 01	7.050E-01	0.000	-6.488E 00	-1.807E 03	-7.474E 02	-1.059E 03	5.684E 03	1.844E 00	9.466E-04	0.000	0.000
8.730E 01	6.750E-01	0.000	1.016E 01	-1.809E 03	-7.499E 02	-1.059E 03	5.707E 03	1.765E 00	9.063E-04	0.000	0.000
8.731E 01	6.749E-01	0.000	1.017E 01	-1.809E 03	-7.499E 02	-1.059E 03	5.707E 03	1.765E 00	9.063E-04	0.000	0.000

READING = 0054 BLOCK = 66 TIME = 15A.45R MACH 6.0 PI = 744.749 TI = 2456.3

X	DDHAG	CDRAG	CF	HC
4.040E 01	1.134E 02	1.134E 02	2.205E-03	4.310E-02
4.041E 01	1.754E-01	1.135E 02	2.207E-03	4.321E-02
4.042E 01	1.420E 01	1.297E 02	2.339E-03	4.667E-02
4.043E 01	1.159E 00	1.309E 02	2.340E-03	4.693E-02
4.044E 01	1.915E 00	1.320E 02	2.343E-03	4.733E-02
4.045E 01	1.709E 01	1.499E 02	2.437E-03	4.844E-02
4.046E 01	2.687E 01	1.788E 02	2.478E-03	4.802E-02
4.047E 01	3.376E 00	1.821E 02	2.403E-03	4.811E-02
4.048E 01	3.405E 00	1.906E 02	2.499E-03	4.828E-02
4.049E 01	4.754E-01	1.910E 02	2.500E-03	4.829E-02
4.050E 01	2.390E 01	2.149E 02	2.531E-03	4.615E-02
4.051E 01	1.649E 01	2.314E 02	2.542E-03	4.314E-02
4.052E 01	6.370E-01	2.321E 02	2.543E-03	4.306E-02
4.053E 01	1.111E 01	2.432E 02	2.537E-03	4.005E-02
4.054E 01	9.458E 00	2.526E 02	2.511E-03	3.622E-02
4.055E 01	6.736E 00	2.594E 02	2.480E-03	3.338E-02
4.056E 01	1.614E 01	2.755E 02	2.634E-03	2.768E-02
4.057E 01	2.030E 01	2.958E 02	2.380E-03	2.149E-02
4.058E 01	4.290E 00	3.001E 02	2.365E-03	2.091E-02
4.059E 01	5.130E 00	3.062E 02	2.344E-03	1.947E-02
4.060E 01	5.677E 00	3.121E 02	2.326E-03	1.822E-02
4.061E 01	6.629E 00	3.187E 02	2.309E-03	1.695E-02
4.062E 01	2.287E 00	3.210E 02	2.261E-03	1.328E-02
4.063E 01	1.099E-01	3.213E 02	2.260E-03	1.323E-02
4.064E 01	7.778E-01	3.221E 02	2.258E-03	1.312E-02
4.065E 01	4.483E-01	3.226E 02	2.252E-03	1.323E-02
4.066E 01	1.566E 00	3.241E 02	2.245E-03	1.314E-02
4.067E 01	1.260E 00	3.254E 02	2.241E-03	1.308E-02
4.068E 01	4.004E 00	3.294E 02	2.233E-03	1.281E-02
4.069E 01	5.572E 00	3.350E 02	2.223E-03	1.267E-02
4.070E 01	1.110E 01	3.461E 02	2.223E-03	1.310E-02
4.071E 01	6.050E 00	3.541E 02	2.222E-03	1.347E-02
4.072E 01	1.381E 01	3.679E 02	2.251E-03	1.296E-02
4.073E 01	1.946E 00	3.699E 02	2.278E-03	1.202E-02
4.074E 01	2.040E-01	3.701E 02	2.292E-03	1.202E-02
4.075E 01	1.015E 00	3.711E 02	2.289E-03	1.190E-02
4.076E 01	7.017E 00	3.781E 02	2.159E-03	7.131E-03
4.077E 01	2.409E 00	3.806E 02	2.220E-03	9.564E-03
4.078E 01	2.931E 00	3.835E 02	2.180E-03	8.084E-03
4.079E 01	2.298E 00	3.858E 02	2.124E-03	6.361E-03
4.080E 01	1.681E 00	3.875E 02	2.102E-03	5.837E-03
4.081E 01	2.375E 00	3.898E 02	2.078E-03	5.155E-03
4.082E 01	1.003E 00	3.908E 02	2.059E-03	4.931E-03
4.083E 01	3.267E 00	3.941E 02	2.023E-03	4.245E-03
4.084E 01	2.804E-01	3.944E 02	2.013E-03	4.065E-03
4.085E 01	1.226E 00	3.956E 02	1.962E-03	3.254E-03
4.086E 01	2.119E-03	3.956E 02	1.962E-03	3.254E-03
4.087E 01	6.843E-01	3.963E 02	1.962E-03	3.320E-03
4.088E 01	1.199E 00	3.975E 02	1.911E-03	2.726E-03
4.089E 01	1.274E 00	3.988E 02	1.940E-03	3.279E-03
4.090E 01	6.889E-01	3.995E 02	1.911E-03	2.940E-03
4.091E 01	2.698E-01	3.997E 02	1.895E-03	2.876E-03
4.092E 01	0.000	3.997E 02	1.895E-03	2.876E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST.....-398. (LBF)  
 MEASURED THRUST.....-319. (LBF)  
 CALCULATED SPECIFIC IMPULSE.....-398. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE.....-319. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT.....-1.611  
 MEASURED THRUST COEFFICIENT.....-2.099

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST.....0. (LBF)  
 NET THRUST.....0. (LBF)  
 SPECIFIC IMPULSE.....0. (LBF=SEC/LBM)  
 THRUST COEFFICIENT.....0.0000

MOMENTUM AND FORCES

INLET FRICTION DRAG.....113.4 (LBF)  
 INLET MOMENTUM CHANGE.....-710.4 (LBF)  
 COMBUSTOR FRICTION DRAG.....256.8 (LBF)  
 COMBUSTOR STRUT DRAG.....9.71 (LBF)  
 COMBUSTOR MOMENTUM CHANGE.....-180. (LBF)  
 NOZZLE FRICTION DRAG.....29.82 (LBF)  
 NOZZLE STRUT DRAG.....0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE.....492. (LBF)  
 NOZZLE PRESSURE INTEGRAL.....322. (LBF)  
 EXTERNAL FRICTION DRAG.....61.10 (LBF)  
 EXTERNAL PRESSURE INTEGRAL.....-953. (LBF)  
 TOTAL EXTERNAL DRAG.....-1024. (LBF)  
 TOTAL STRUT DRAG.....9.71 (LBF)  
 CAVITY FORCE.....-1167. (LBF)  
 CALCULATED LOAD CELL FORCE.....-2589. (LBF)  
 MEASURED LOAD CELL FORCE.....-2710. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

INLET

ANGLE OF ATTACK.....0.000 (DEGREES)  
 MASS FLOW RATIO.....0.9863  
 ADDITIVE DRAG COEFFICIENT.....0.0000  
 LIMITING PRESSURE RECOVERY EFFICIENCY.....0.1622  
 DELTA PT2.....0.1171 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC.....0.3963  
 TOTAL PRESSURE RECOVERY - SUBSONIC.....0.1645  
 INLET PROCESS EFFICIENCY - SUPERSONIC.....0.8938  
 INLET PROCESS EFFICIENCY - SUBSONIC.....0.9045  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC.....0.8943  
 KINETIC ENERGY EFFICIENCY - SUBSONIC.....0.8943  
 ENTHALPY AT PO - SUPERSONIC.....-6.23 (BTU/LBM)  
 ENTHALPY AT PO - SUBSONIC.....28.77 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO.....0.0000  
 EQUIVALENCE RATIO.....0.000  
 COMBUSTOR EFFICIENCY.....0.000  
 TOTAL PRESSURE RATIO.....0.8401  
 COMBUSTOR EFFECTIVENESS.....0.6612  
 INJECTOR DISCHARGE COEFFICIENTS

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CG.....1.0049  
 NOZZLE COEFFICIENT - CT.....0.9624  
 PROCESS EFFICIENCY.....1.0650  
 KINETIC ENERGY EFFICIENCY.....1.0098

STATIONS

NOMINAL COWL LEADING EDGE.....34.884 (IN)  
 SPIKE TRANSLATION.....0.5328 (IN)  
 INLET THROAT.....40.400 (IN)  
 COWL LEADING EDGE.....35.217 (IN)  
 NOZZLE SHOULDER TRAILING EDGE.....73.557 (IN)  
 NOZZLE PLUG TRAILING EDGE.....87.309 (IN)  
 STRUT LEADING EDGE.....56.473 (IN)  
 STRUT TRAILING EDGE.....65.073 (IN)  
 COMBUSTOR EXIT.....65.073 (IN)

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.318	
1C	44.300	
2A	46.793	
2C	46.250	
3A	54.083	
3B	56.268	
4	44.818	

Reading 54

$t = 185.26 \text{ sec.}$

READING = 0054 BLOCK = 98 TIME = 105.258 MACH 6.0 PT = 746.249 TT = 2990.4  
 JET PERFORMANCE

SUMMARY REPORT

WIND TUNNEL	P	T	U	M	GAMMA	MOLNT	SONV	MACH	VEL	S	A/A	N	A/AC	MOMTM	O	IVAC	PHI	ETAC
0.000 746.249 2998	1	668.9( 794)	1.2927	28.972	2579													
0.000 0.389 407	2	31.2( 96)	1.3989	28.971	988	5.988	5919	1.827	0.10607	26.711	0.9831			5012	9.757	187.6		
0.000 16.025 2998	3	668.9( 794)	1.2926	28.971	2579													
0.000 16.280 2930	4	668.2( 774)	1.2948	28.971	2551	0.399	1018	2.082	0.10607	26.711	0.9831			4945	1.679	185.1		
WIND TUNNEL																		
0.000 746.249 2998	5	668.9( 794)	1.2927	28.972	2579													
0.000 0.380 404	6	31.9( 97)	1.3989	28.971	985	6.011	5922	1.827	0.10433	26.272	0.9831			4931	9.601	187.7		
0.000 16.025 2998	7	668.9( 794)	1.2926	28.971	2579													
0.000 16.344 2932	8	669.0( 774)	1.2947	28.971	2553	0.391	998	2.082	0.10433	26.272	0.9831			4931	1.619	187.7		
INLET THROAT																		
40.400 298.521 2946	9	633.0( 778)	1.2944	28.972	2558													
40.400 15.508 1432	10	224.0( 393)	1.3517	28.971	1822	2.543	4633	1.805	0.94084	26.711	0.1108			4287	67.747	160.5		
INLET UPNRSK																		
40.400 298.521 2946	11	633.0( 778)	1.2944	28.972	2558													
40.400 13.324 1376	12	209.4( 338)	1.3550	28.971	1789	2.634	4712	1.805	0.85531	26.711	0.1219			4328	62.627	162.0		
INLET DOWNRSK																		
40.400 123.289 2946	13	633.0( 778)	1.2944	28.972	2558													
40.400 106.021 2846	14	633.1( 749)	1.2975	28.972	2517	0.486	1225	1.905	0.85531	26.711	0.1219			4328	16.279	162.0		
COMBUSTOR																		
40.410 246.950 2911	15	636.2( 801)	1.2966	27.737	2601													
40.410 12.319 1394	16	210.1( 358)	1.3551	27.737	1840	2.568	4724	1.965	0.94399	26.804	0.1109			4286	69.310	159.9	0.10	0.07
COMBUSTOR																		
41.322 180.999 2843	17	639.6( 813)	1.3004	26.553	2631													
41.322 16.008 1573	18	269.0( 428)	1.3469	26.553	1992	2.220	4421	2.049	0.94876	26.898	0.1107			4152	65.189	154.4	0.21	0.04
COMBUSTOR																		
41.332 189.611 2801	19	659.6( 800)	1.3024	26.509	2616													
41.332 16.129 1528	20	269.5( 412)	1.3497	26.509	1967	2.247	4418	2.041	0.94905	26.898	0.1107			4151	65.164	154.3	0.21	0.01
COMBUSTOR																		
41.397 186.250 2794	21	659.4( 798)	1.3028	26.502	2613													
41.397 16.398 1533	22	272.9( 414)	1.3495	26.502	1970	2.232	4397	2.041	0.94949	26.898	0.1106			4141	64.887	153.9	0.21	0.00
COMBUSTOR																		
41.500 185.043 2791	23	659.0( 797)	1.3028	26.501	2612													
41.500 17.395 1562	24	281.6( 422)	1.3480	26.501	1987	2.187	4346	2.042	0.95031	26.898	0.1105			4125	64.177	153.4	0.21	0.00
COMBUSTOR																		
42.400 160.021 2776	25	654.1( 742)	1.3033	26.501	2606													
42.400 22.550 1722	26	328.7( 469)	1.3403	26.501	2081	1.939	4036	2.051	0.94043	26.898	0.1117			4019	58.982	149.4	0.21	0.00
COMBUSTOR																		
44.117 114.319 3146	27	652.5( 904)	1.2855	26.939	2732													
44.117 37.508 2436	28	414.0( 680)	1.3093	26.940	2426	1.394	3381	2.106	0.90748	26.898	0.1157			3939	47.686	146.4	0.21	0.36
COMBUSTOR																		
44.310 112.326 3170	29	650.9( 911)	1.2843	26.970	2739													
44.310 38.892 2497	30	420.6( 688)	1.3073	26.971	2448	1.356	3320	2.108	0.90593	26.898	0.1159			3930	46.738	146.1	0.21	0.36
COMBUSTOR																		
44.800 108.350 3216	31	636.3( 925)	1.2819	27.038	2753													
44.800 42.399 2601	32	436.2( 730)	1.3026	27.040	2496	1.268	3164	2.113	0.90243	26.898	0.1164			3909	44.373	145.3	0.21	0.43
COMBUSTOR																		
44.832 106.256 3217	33	635.9( 928)	1.2818	27.040	2754													
44.832 42.511 2606	34	436.6( 731)	1.3025	27.042	2497	1.265	3158	2.114	0.90227	26.898	0.1164			3908	44.289	145.3	0.21	0.44
COMBUSTOR																		
46.250 98.810 2901	35	645.2( 919)	1.2987	24.022	2792													
46.250 47.477 2443	36	483.6( 759)	1.3141	24.022	2577	1.104	2844	2.282	0.85942	27.164	0.1234			3902	37.986	143.6	0.51	0.14

HEADING = 0054 BLOCK = 98 TIME = 185.250 MACH 6.0 PI = 746.244 TI = 2996.4

	P	T	M	GAMMA	MOL-T	SONV	MACH	VEL	S	W/A	M	A/C	POMTH	Q	IVAC	PMI	ETAC
COMBUSTOR	0	19	12	2													
46.260	98.748	2903	645.1	(919)	1.2986	24.025	2793						3903	37.936	183.7	0.51	0.14
46.260	47.512	2405	483.6	(760)	1.3139	24.025	2579	1.102	2843	2.282	0.85671	27.164	0.1235				
COMBUSTOR	0	20	13	4													
47.230	94.451	3136	633.7	(997)	1.2812	24.283	2875						4028	33.683	148.3	0.51	0.25
47.310	51.149	2728	487.0	(654)	1.3010	24.284	2696	1.005	2710	2.305	0.79903	27.164	0.1287				
COMBUSTOR	0	21	14	3													
47.357	94.339	3106	633.2	(1001)	1.2867	24.295	2878						4034	33.357	148.5	0.51	0.25
47.357	51.637	2746	488.3	(859)	1.3003	24.296	2702	0.997	2693	2.305	0.79690	27.164	0.1331				
COMBUSTOR	0	22	15	4													
48.110	90.853	3305	635.5	(1068)	1.2767	24.518	2943						4151	30.745	152.8	0.51	0.35
48.110	52.263	2961	484.3	(931)	1.2900	24.520	2783	0.955	2658	2.322	0.78440	27.164	0.1425				
COMBUSTOR	0	23	16	6													
48.797	85.581	3080	637.7	(1071)	1.2934	21.759	2998						4248	32.845	154.7	0.85	0.19
48.797	41.175	2566	450.8	(887)	1.3095	21.760	2771	1.104	3059	2.508	0.69098	27.467	0.1552				
COMBUSTOR	0	24	17	2													
48.807	85.529	3083	637.7	(1071)	1.2933	21.761	2999						4250	32.852	154.7	0.85	0.19
48.807	41.071	2567	450.1	(887)	1.3094	21.762	2771	1.105	3063	2.508	0.69008	27.467	0.1554				
COMBUSTOR	0	25	18	4													
49.337	83.036	3147	633.1	(1110)	1.2882	21.864	3036						4350	33.304	158.4	0.85	0.22
49.337	35.592	2591	412.7	(844)	1.3071	21.865	2775	1.197	3321	2.520	0.64539	27.467	0.1662				
COMBUSTOR	0	26	19	5													
50.747	74.738	3533	621.9	(1253)	1.2633	22.244	3165						4384	29.766	166.9	0.85	0.33
50.747	32.825	2942	379.6	(1022)	1.2896	22.249	2912	1.196	3482	2.558	0.55005	27.467	0.1950				
COMBUSTOR	0	27	20	4													
52.847	68.810	3815	607.9	(1362)	1.2519	22.550	3245						4867	28.395	177.2	0.85	0.43
52.847	23.100	3032	279.6	(1050)	1.2819	22.565	2926	1.385	4053	2.582	0.45083	27.467	0.2379				
COMBUSTOR	0	28	21	2													
53.347	68.806	3804	604.9	(1358)	1.2523	22.546	3241						4919	26.369	179.1	0.85	0.43
53.347	20.700	2951	248.7	(1019)	1.2849	22.562	2890	1.461	4222	2.581	0.43240	27.467	0.2480				
COMBUSTOR	0	29	22	4													
54.097	67.061	3864	600.5	(1381)	1.2484	22.616	3257						4988	27.507	181.6	0.85	0.45
54.097	19.005	2966	223.7	(1023)	1.2633	22.635	2891	1.502	4343	2.586	0.40760	27.467	0.2631				
COMBUSTOR	0	30	23	3													
54.837	65.948	3896	596.4	(1393)	1.2483	22.658	3264						5051	26.794	183.9	0.85	0.46
54.837	17.267	2944	196.6	(1014)	1.2835	22.679	2878	1.554	4473	2.589	0.38545	27.467	0.2742				
COMBUSTOR	0	31	24	4													
55.760	64.350	3944	591.9	(1411)	1.2430	22.717	3276						5117	25.857	186.3	0.85	0.48
55.760	15.799	2945	170.7	(1013)	1.2826	22.742	2874	1.596	4591	2.593	0.36243	27.467	0.2959				
COMBUSTOR	0	32	25	5													
56.262	50.679	4390	589.5	(1562)	1.2097	23.189	3374						5283	20.569	192.3	0.85	0.63
56.262	14.939	3503	177.6	(1222)	1.2523	23.275	3061	1.483	4540	2.635	0.29156	27.467	0.3678				
COMBUSTOR	0	33	26	5													
56.337	58.605	4000	589.2	(1432)	1.2389	22.780	3289						5287	22.303	192.5	0.85	0.50
56.337	11.303	2844	102.1	(972)	1.2853	22.811	2822	1.749	4937	2.604	0.29069	27.467	0.3689				
COMBUSTOR	0	34	27	3													
56.477	58.467	4006	588.6	(1434)	1.2384	22.788	3290						5295	22.199	192.8	0.85	0.50
56.477	11.228	2895	98.8	(972)	1.2851	22.820	2822	1.754	4951	2.604	0.28855	27.467	0.3717				
COMBUSTOR	0	35	28	7													
56.537	51.723	4368	588.3	(1574)	1.2116	23.168	3370						5300	20.913	193.0	0.85	0.62
56.537	14.466	3444	193.3	(1199)	1.2554	23.250	3041	1.517	4611	2.632	0.29183	27.467	0.3675				
COMBUSTOR	0	36	29	3													
56.837	52.553	4346	587.1	(1565)	1.2134	23.148	3366						5316	21.105	193.5	0.85	0.61
56.837	14.025	3368	150.0	(1177)	1.2593	23.226	3021	1.548	4676	2.630	0.29097	27.467	0.3686				
COMBUSTOR	0	37	30	4													
57.003	53.770	4299	586.1	(1547)	1.2171	23.099	3356						5327	21.450	194.0	0.85	0.60
57.003	13.418	3293	134.5	(1141)	1.2632	23.169	2968	1.591	4754	2.625	0.29037	27.467	0.3693				

READING = 0034 BLOCK = 98 TIME = 105.258 MACH 6.0 PI = 746.249 TI = 2998.4

	P	T	M	GAMMA	MOLWT/SONV	MACH	VEL	S	W/A	A	AJAC	MUMTM	U	IVAL	PHI	ETAC
COMBUSTOR	0	38	31	4												
57.787	57.989	4126	583.1(1480)	1.2301	22.925	3318										
57.787	11.475	2973	87.5(1019)	1.2785	22.969	2868	1.736	4980	2.610	0.28576	27.467	0.3753	5354	22.116	194.4	0.65 0.54
COMBUSTOR	0	39	32	6												
58.807	102.736	3353	579.6(1185)	1.3767	22.172	3098										
58.807	6.112	1727	45.2( 568)	1.3360	22.175	2275	2.458	5592	2.511	0.28394	27.467	0.3777	5365	24.674	195.3	0.85 0.31
COMBUSTOR	0	40	33	6												
60.817	50.668	4594	573.4(1661)	1.1932	23.450	3409										
60.817	16.225	3784	170.6(1328)	1.2339	23.587	3137	1.431	4490	2.640	0.29382	27.467	0.3650	5350	20.502	194.6	0.85 0.72
COMBUSTOR	0	41	34	3												
62.237	51.672	4993	568.9(1660)	1.1938	23.461	3408										
62.237	16.816	3795	171.4(1332)	1.2330	23.596	3140	1.420	4459	2.638	0.30179	27.467	0.3553	5338	20.915	194.3	0.85 0.72
COMBUSTOR	0	42	35	5												
64.701	46.051	4824	560.0(1709)	1.1724	23.740	3442										
64.701	19.444	4254	233.8(1511)	1.1982	23.940	3254	1.242	4040	2.654	0.28606	27.467	0.3749	5316	17.961	193.5	0.65 0.83
COMBUSTOR	0	43	36	4												
65.077	41.960	4941	558.5(1795)	1.1611	23.874	3456										
65.077	20.460	4497	277.7(1607)	1.1774	24.100	3305	1.134	3748	2.664	0.28894	27.467	0.4032	5313	15.492	193.4	0.85 0.90
COMBUSTOR	0	44	37	3												
65.077	41.960	5027	630.5(1832)	1.1568	23.788	3484										
65.077	22.264	4646	375.0(1670)	1.1684	24.014	3352	1.055	3571	2.678	0.28594	27.467	0.4032	5348	14.760	194.7	0.65 0.90
NOZZLE	AE	45	38	5												
67.313	41.960	4941	558.5(1760)	1.1611	23.874	3456										
67.313	1.294	2724	536.1( 899)	1.2708	24.334	2660	2.793	7401	2.664	0.05536	27.467	1.9371	6960	6.367	253.4	0.65 0.90
NOZZLE	P0	46	39	5												
67.313	41.960	4941	558.5(1760)	1.1611	23.874	3456										
67.313	0.389	2090	771.3( 665)	1.2952	24.336	2351	3.469	8157	2.664	0.02392	27.467	4.4841	7411	3.032	264.0	0.65 0.90
NOZZLE	AE	47	40	5												
67.313	41.960	5027	630.5(1832)	1.1568	23.788	3484										
67.313	1.338	2648	488.2( 945)	1.2660	24.333	2714	2.757	7482	2.678	0.05536	27.467	1.9371	7052	6.437	256.7	0.85 0.90
NOZZLE	P0	48	41	5												
67.313	41.960	5027	630.5(1832)	1.1568	23.788	3484										
67.313	0.389	2175	740.5( 696)	1.2916	24.336	2396	3.457	8283	2.678	0.02333	27.467	4.5969	7529	3.003	274.1	0.85 0.90
FICTIVE	COMBUSTOR	68	61	0												
65.077	298.521	5317	558.5(1943)	1.1682	24.294	3566										
65.077	0.389	1448	1139.7( 440)	1.3258	24.753	1962	4.699	9218	2.501	0.03968	27.467	2.7024	8139	5.689	296.3	0.85 1.00
FICTIVE	NOZZLE	69	62	0												
67.313	24.492	4857	533.8(1761)	1.1570	23.844	3423										
67.313	1.674	3177	356.9(1073)	1.2509	24.326	2850	2.342	6676	2.703	0.05536	27.467	1.9371	6530	5.744	237.7	0.85 0.90

READING = 0050 BLOCK = 98 TIME = 105.250 MACH 0.0 PT = 100.000 TT = 209.000

XABS	P-10	P-08	PDA	QOX	W-10	G-08	LAWALL	P-10/P80	P-10/P10	P-08/P80	P-08/P10
6.981E-01	9.700E-01	0.000	-4.393E-01	0.000	0.000	0.000	2.470E-02	2.493E 00	1.300E-03	0.000	0.000
1.836E 01	9.700E-01	0.000	-3.233E 01	0.000	0.000	0.000	1.634E 02	2.493E 00	1.300E-03	0.000	0.000
3.070E 01	1.240E 00	0.000	-1.576E 02	0.000	0.000	0.000	5.450E 00	2.493E 00	1.300E-03	0.000	0.000
3.508E 01	3.444E 00	0.000	-1.508E 02	0.000	0.000	0.000	6.804E 02	9.441E 00	5.151E-03	0.000	0.000
3.521E 01	3.891E 00	5.777E 00	-4.187E 02	0.000	0.000	0.000	6.864E 02	1.000E 01	5.215E-03	1.485E 01	7.741E-03
3.522E 01	3.894E 00	5.739E 00	-4.187E 02	0.000	0.000	0.000	6.866E 02	1.001E 01	5.217E-03	1.478E 01	7.690E-03
3.555E 01	4.010E 00	3.656E 00	-4.260E 02	0.000	0.000	0.000	7.194E 02	1.031E 01	5.374E-03	9.197E 00	4.699E-03
3.569E 01	3.921E 00	1.525E 00	-4.426E 02	0.000	0.000	0.000	7.539E 02	1.008E 01	5.254E-03	3.920E 00	2.044E-03
3.606E 01	3.875E 00	2.501E 00	-4.527E 02	0.000	0.000	0.000	7.716E 02	9.961E 00	5.193E-03	6.430E 00	3.352E-03
3.648E 01	4.171E 00	4.868E 00	-4.711E 02	0.000	0.000	0.000	8.152E 02	1.072E 01	5.589E-03	1.251E 01	6.524E-03
3.701E 01	4.315E 00	7.855E 00	-4.925E 02	0.000	0.000	0.000	8.713E 02	1.108E 01	5.782E-03	2.019E 01	1.053E-02
3.703E 01	4.309E 00	7.950E 00	-4.930E 02	0.000	0.000	0.000	8.731E 02	1.108E 01	5.774E-03	2.044E 01	1.065E-02
3.735E 01	4.198E 00	7.800E 00	-5.035E 02	0.000	0.000	0.000	9.074E 02	1.079E 01	5.625E-03	2.005E 01	1.043E-02
3.768E 01	4.013E 00	1.087E 01	-5.206E 02	0.000	0.000	0.000	9.651E 02	1.032E 01	5.378E-03	2.796E 01	1.457E-02
3.803E 01	3.960E 00	1.102E 01	-5.224E 02	0.000	0.000	0.000	9.820E 02	1.018E 01	5.307E-03	2.832E 01	1.476E-02
3.837E 01	3.565E 00	1.132E 01	-5.278E 02	0.000	0.000	0.000	1.020E 03	1.430E 01	7.457E-03	2.911E 01	1.518E-02
3.875E 01	7.391E 00	1.455E 01	-5.346E 02	0.000	0.000	0.000	1.063E 03	1.900E 01	9.904E-03	3.739E 01	1.949E-02
3.884E 01	7.605E 00	1.527E 01	-5.352E 02	0.000	0.000	0.000	1.073E 03	2.008E 01	1.046E-02	3.927E 01	2.047E-02
3.901E 01	8.630E 00	1.564E 01	-5.348E 02	0.000	0.000	0.000	1.092E 03	2.215E 01	1.156E-02	4.019E 01	2.095E-02
3.935E 01	1.473E 01	1.634E 01	-5.417E 02	0.000	0.000	0.000	1.131E 03	3.788E 01	1.973E-02	4.200E 01	2.189E-02
3.950E 01	1.750E 01	1.505E 01	-5.408E 02	0.000	0.000	0.000	1.149E 03	4.499E 01	2.345E-02	3.869E 01	2.017E-02
3.984E 01	1.722E 01	1.222E 01	-5.655E 02	0.000	0.000	0.000	1.188E 03	4.573E 01	2.394E-02	3.143E 01	1.638E-02
4.000E 01	1.793E 01	9.320E 00	-5.752E 02	0.000	0.000	0.000	1.207E 03	4.609E 01	2.403E-02	2.396E 01	1.249E-02
4.034E 01	2.071E 01	3.325E 01	-6.059E 02	0.000	0.000	0.000	1.247E 03	5.332E 01	2.775E-02	8.547E 00	4.456E-03
4.040E 01	2.123E 01	3.326E 01	-6.122E 02	0.000	0.000	0.000	1.254E 03	5.457E 01	2.855E-02	8.551E 00	4.457E-03
4.041E 01	2.131E 01	3.327E 01	-6.136E 02	0.000	0.000	0.000	1.255E 03	5.479E 01	2.856E-02	8.551E 00	4.458E-03
4.132E 01	2.863E 01	3.345E 01	-7.285E 02	0.000	0.000	0.000	1.363E 03	7.411E 01	3.863E-02	8.599E 00	4.445E-03
4.133E 01	2.891E 01	3.346E 01	-7.299E 02	0.000	0.000	0.000	1.364E 03	7.432E 01	3.874E-02	8.600E 00	4.483E-03
4.140E 01	2.945E 01	3.347E 01	-7.366E 02	0.000	0.000	0.000	1.372E 03	7.570E 01	3.946E-02	8.603E 00	4.485E-03
4.150E 01	3.030E 01	4.470E 00	-7.525E 02	0.000	0.000	0.000	1.385E 03	7.789E 01	4.060E-02	1.149E 01	5.990E-03
4.246E 01	3.019E 01	1.491E 01	-8.413E 02	0.000	0.000	0.000	1.499E 03	7.760E 01	4.055E-02	3.833E 01	1.998E-02
4.246E 01	4.206E 01	3.293E 01	-8.944E 02	0.000	0.000	0.000	1.700E 03	1.082E 02	5.659E-02	8.468E 01	4.413E-02
4.400E 01	4.331E 01	3.431E 01	-8.999E 02	0.000	0.000	0.000	1.723E 03	1.117E 02	5.825E-02	8.821E 01	4.598E-02
4.480E 01	4.699E 01	3.781E 01	-9.135E 02	0.000	0.000	0.000	1.783E 03	1.208E 02	6.286E-02	9.778E 01	5.067E-02
4.683E 01	4.698E 01	3.604E 01	-9.139E 02	0.000	0.000	0.000	1.787E 03	1.208E 02	6.286E-02	9.778E 01	5.067E-02
4.683E 01	4.679E 01	4.616E 01	-8.549E 02	0.000	0.000	0.000	1.961E 03	1.203E 02	6.270E-02	1.238E 02	6.484E-02
4.626E 01	4.679E 01	4.623E 01	-8.535E 02	0.000	0.000	0.000	1.963E 03	1.203E 02	6.270E-02	1.240E 02	6.483E-02
4.731E 01	4.665E 01	5.573E 01	-7.144E 02	0.000	0.000	0.000	2.093E 03	1.193E 02	6.251E-02	1.423E 02	7.468E-02
4.736E 01	4.721E 01	5.606E 01	-7.080E 02	0.000	0.000	0.000	2.099E 03	1.214E 02	6.326E-02	1.441E 02	7.513E-02
4.811E 01	5.625E 01	4.828E 01	-5.825E 02	0.000	0.000	0.000	2.192E 03	1.448E 02	7.588E-02	1.241E 02	6.469E-02
4.880E 01	4.117E 01	4.117E 01	-4.393E 02	0.000	0.000	0.000	2.278E 03	1.098E 02	5.518E-02	1.058E 02	5.518E-02
4.881E 01	4.107E 01	4.107E 01	-4.372E 02	0.000	0.000	0.000	2.280E 03	1.056E 02	5.504E-02	1.056E 02	5.504E-02
4.934E 01	3.559E 01	3.559E 01	-3.313E 02	0.000	0.000	0.000	2.346E 03	9.149E 01	4.769E-02	4.149E 01	4.769E-02
5.075E 01	3.227E 01	3.227E 01	-8.042E 01	0.000	0.000	0.000	2.524E 03	8.297E 01	4.325E-02	8.297E 01	4.325E-02
5.285E 01	2.310E 01	2.310E 01	-2.249E 02	0.000	0.000	0.000	2.790E 03	5.934E 01	3.095E-02	5.934E 01	3.095E-02
5.335E 01	2.070E 01	2.070E 01	-2.816E 02	0.000	0.000	0.000	2.854E 03	5.321E 01	2.774E-02	5.321E 01	2.774E-02
5.410E 01	1.901E 01	1.901E 01	-3.582E 02	0.000	0.000	0.000	2.949E 03	4.685E 01	2.547E-02	4.685E 01	2.547E-02
5.486E 01	1.729E 01	1.729E 01	-4.285E 02	0.000	0.000	0.000	3.047E 03	4.444E 01	2.317E-02	4.444E 01	2.317E-02
5.574E 01	1.580E 01	1.580E 01	-5.035E 02	0.000	0.000	0.000	3.163E 03	4.061E 01	2.117E-02	4.061E 01	2.117E-02
5.626E 01	1.494E 01	1.494E 01	-6.728E 02	0.000	0.000	0.000	3.209E 03	3.840E 01	2.002E-02	3.840E 01	2.002E-02
5.634E 01	7.837E 00	1.485E 01	-6.771E 02	0.000	0.000	0.000	3.216E 03	2.015E 01	1.050E-02	3.817E 01	1.990E-02
5.688E 01	7.837E 00	1.462E 01	-6.867E 02	0.000	0.000	0.000	3.234E 03	2.015E 01	1.050E-02	3.758E 01	1.959E-02
5.688E 01	1.449E 01	1.449E 01	-6.925E 02	0.000	0.000	0.000	3.244E 03	3.724E 01	1.941E-02	3.724E 01	1.941E-02
5.688E 01	1.402E 01	1.402E 01	-7.111E 02	0.000	0.000	0.000	3.240E 03	3.605E 01	1.879E-02	3.605E 01	1.879E-02
5.706E 01	1.342E 01	1.342E 01	-7.245E 02	0.000	0.000	0.000	3.309E 03	3.449E 01	1.798E-02	3.449E 01	1.798E-02
5.779E 01	1.147E 01	1.147E 01	-7.582E 02	0.000	0.000	0.000	3.402E 03	2.950E 01	1.538E-02	2.950E 01	1.538E-02



XAS	P=IB	P=OB	PDA	GUX	WUB	WUB	WUB	CWALL	P=IB/P80	P=IB/P10	P=OB/P80	P=OB/P10
5.081E 01	6.112E 00	6.112E 00	7.786E 02	-3.848E 03	-1.703E 03	-2.144E 03	3.532E 03	1.571E 01	8.191E=03	8.191E=03	1.571E 01	8.191E=03
6.082E 01	1.622E 01	1.622E 01	7.812E 02	-4.017E 03	-1.748E 03	-2.269E 03	3.790E 03	4.171E 01	2.174E=02	2.174E=02	4.171E 01	2.174E=02
6.224E 01	1.682E 01	1.682E 01	7.812E 02	-4.135E 03	-1.788E 03	-2.365E 03	3.972E 03	4.323E 01	2.254E=02	2.254E=02	4.323E 01	2.254E=02
6.470E 01	1.944E 01	1.944E 01	7.812E 02	-4.366E 03	-1.848E 03	-2.536E 03	4.289E 03	4.998E 01	2.605E=02	2.605E=02	4.998E 01	2.605E=02
6.508E 01	2.107E 01	1.984E 01	7.812E 02	-4.438E 03	-1.861E 03	-2.567E 03	4.337E 03	5.418E 01	2.824E=02	2.824E=02	5.418E 01	2.824E=02
6.512E 01	2.107E 01	1.989E 01	7.812E 02	-4.472E 03	-1.862E 03	-2.570E 03	4.342E 03	5.418E 01	2.824E=02	2.824E=02	5.418E 01	2.824E=02
6.532E 01	2.001E 01	2.010E 01	7.812E 02	-4.454E 03	-1.869E 03	-2.585E 03	4.368E 03	5.145E 01	2.683E=02	2.683E=02	5.145E 01	2.683E=02
6.498E 01	1.120E 01	9.720E 00	9.501E 02	-4.609E 03	-1.917E 03	-2.692E 03	4.583E 03	2.879E 01	1.501E=02	1.501E=02	2.879E 01	1.501E=02
6.765E 01	8.020E 00	9.367E 00	1.144E 03	-4.600E 03	-1.931E 03	-2.728E 03	4.665E 03	2.062E 01	1.075E=02	1.075E=02	2.062E 01	1.075E=02
6.442E 01	4.365E 00	7.129E 00	1.341E 03	-4.716E 03	-1.946E 03	-2.770E 03	4.760E 03	1.122E 01	5.849E=03	5.849E=03	1.122E 01	5.849E=03
6.514E 01	3.485E 00	5.035E 00	1.468E 03	-4.788E 03	-1.957E 03	-2.811E 03	4.848E 03	8.959E 00	4.670E=03	4.670E=03	8.959E 00	4.670E=03
6.975E 01	2.740E 00	4.204E 00	1.590E 03	-4.811E 03	-1.964E 03	-2.847E 03	4.922E 03	7.043E 00	3.672E=03	3.672E=03	7.043E 00	3.672E=03
7.070E 01	1.972E 00	2.910E 00	1.643E 03	-4.812E 03	-1.972E 03	-2.900E 03	5.036E 03	5.070E 00	2.645E=03	2.645E=03	5.070E 00	2.645E=03
7.113E 01	1.625E 00	2.668E 00	1.675E 03	-4.866E 03	-1.975E 03	-2.921E 03	5.088E 03	4.177E 00	2.178E=03	2.178E=03	4.177E 00	2.178E=03
7.266E 01	1.192E 00	1.805E 00	1.759E 03	-4.961E 03	-1.985E 03	-2.976E 03	5.273E 03	3.065E 00	1.598E=03	1.598E=03	3.065E 00	1.598E=03
7.281E 01	1.150E 00	1.626E 00	1.765E 03	-4.962E 03	-1.985E 03	-2.980E 03	5.290E 03	2.958E 00	1.541E=03	1.541E=03	2.958E 00	1.541E=03
7.358E 01	1.170E 00	7.300E=01	1.805E 03	-4.992E 03	-1.989E 03	-3.003E 03	5.374E 03	3.007E 00	1.568E=03	1.568E=03	3.007E 00	1.568E=03
7.358E 01	1.170E 00	7.232E=01	1.807E 03	-4.993E 03	-1.989E 03	-3.003E 03	5.375E 03	3.007E 00	1.568E=03	1.568E=03	3.007E 00	1.568E=03
7.489E 01	1.205E 00	0.000	1.832E 03	-5.046E 03	-1.996E 03	-3.050E 03	5.426E 03	3.096E 00	1.615E=03	1.615E=03	3.096E 00	1.615E=03
7.774E 01	2.270E 00	0.000	1.901E 03	-5.058E 03	-2.004E 03	-3.050E 03	5.525E 03	5.835E 00	3.042E=03	3.042E=03	5.835E 00	3.042E=03
8.164E 01	1.465E 00	0.000	1.981E 03	-5.072E 03	-2.021E 03	-3.050E 03	5.630E 03	3.768E 00	1.963E=03	1.963E=03	3.768E 00	1.963E=03
8.445E 01	1.175E 00	0.000	2.012E 03	-5.084E 03	-2.034E 03	-3.050E 03	5.684E 03	3.020E 00	1.575E=03	1.575E=03	3.020E 00	1.575E=03
8.731E 01	1.665E 00	0.000	2.048E 03	-5.105E 03	-2.055E 03	-3.050E 03	5.707E 03	4.331E 00	2.258E=03	2.258E=03	4.331E 00	2.258E=03
8.731E 01	1.666E 00	0.000	2.049E 03	-5.105E 03	-2.055E 03	-3.050E 03	5.707E 03	4.334E 00	2.259E=03	2.259E=03	4.334E 00	2.259E=03

READING = 0054 BLOCK = 98 TIME = 105.250 MACH 6.0 PT = 746.249 TI = 2998.4

X	UDRAG	CURAG	CF	HC
4.040E 01	1.152E 02	1.152E 02	2.197E-03	4.313E-02
4.041E 01	1.896E-01	1.154E 02	2.489E-03	3.523E-02
4.132E 01	1.865E 01	1.341E 02	2.653E-03	4.204E-02
4.133E 01	1.937E-01	1.343E 02	2.471E-03	4.475E-02
4.140E 01	1.217E 00	1.355E 02	2.403E-03	4.559E-02
4.150E 01	1.913E 00	1.374E 02	2.413E-03	4.747E-02
4.246E 01	1.736E 01	1.547E 02	2.496E-03	5.444E-02
4.412E 01	2.724E 01	1.820E 02	2.575E-03	6.935E-02
4.431E 01	3.005E 00	1.890E 02	2.825E-03	6.992E-02
4.480E 01	7.726E 00	1.927E 02	2.848E-03	6.627E-02
4.483E 01	4.944E-01	1.932E 02	2.877E-03	6.563E-02
4.625E 01	2.182E 01	2.150E 02	3.212E-03	6.264E-02
4.626E 01	1.436E-01	2.152E 02	2.889E-03	7.091E-02
4.731E 01	1.333E 01	2.285E 02	2.800E-03	7.183E-02
4.736E 01	3.636E-01	2.291E 02	2.971E-03	6.883E-02
4.811E 01	8.915E 00	2.300E 02	2.954E-03	6.844E-02
4.860E 01	8.460E 00	2.464E 02	3.239E-03	5.843E-02
4.881E 01	1.267E-01	2.466E 02	2.918E-03	6.537E-02
4.934E 01	6.349E 00	2.529E 02	2.856E-03	6.194E-02
5.075E 01	1.589E 01	2.688E 02	2.800E-03	5.744E-02
5.285E 01	2.196E 01	2.908E 02	2.851E-03	4.582E-02
5.335E 01	5.252E 00	2.960E 02	2.956E-03	4.143E-02
5.410E 01	7.866E 00	3.039E 02	2.920E-03	3.916E-02
5.486E 01	7.716E 00	3.110E 02	2.917E-03	3.899E-02
5.576E 01	8.892E 00	3.205E 02	2.902E-03	3.433E-02
5.628E 01	3.115E 00	3.235E 02	2.875E-03	3.103E-02
5.634E 01	4.472E-01	3.240E 02	3.087E-03	2.899E-02
5.648E 01	1.166E 00	3.252E 02	2.851E-03	2.642E-02
5.656E 01	6.815E-01	3.259E 02	3.337E-03	2.873E-02
5.684E 01	2.385E 00	3.283E 02	3.032E-03	2.841E-02
5.706E 01	1.855E 00	3.301E 02	3.009E-03	2.784E-02
5.779E 01	6.019E 00	3.362E 02	2.956E-03	2.558E-02
5.881E 01	8.883E 00	3.450E 02	2.853E-03	1.722E-02
6.082E 01	1.578E 01	3.608E 02	2.544E-03	3.591E-02
6.224E 01	1.070E 01	3.715E 02	3.108E-03	3.044E-02
6.470E 01	1.926E 01	3.908E 02	3.162E-03	3.166E-02
6.508E 01	2.613E 00	3.934E 02	3.316E-03	3.090E-02
6.512E 01	2.695E-01	3.937E 02	3.437E-03	3.026E-02
6.532E 01	1.372E 00	3.950E 02	3.433E-03	3.009E-02
6.698E 01	1.164E 01	4.067E 02	3.338E-03	2.235E-02
6.765E 01	4.320E 00	4.110E 02	3.314E-03	2.003E-02
6.842E 01	4.532E 00	4.155E 02	3.260E-03	1.535E-02
6.914E 01	3.627E 00	4.192E 02	3.219E-03	1.250E-02
6.975E 01	2.702E 00	4.218E 02	3.192E-03	1.081E-02
7.070E 01	3.609E 00	4.255E 02	3.145E-03	8.381E-03
7.113E 01	1.431E 00	4.269E 02	3.125E-03	7.599E-03
7.266E 01	4.403E 00	4.313E 02	3.078E-03	5.789E-03
7.281E 01	3.593E-01	4.317E 02	3.068E-03	5.459E-03
7.356E 01	1.534E 00	4.332E 02	3.015E-03	4.070E-03
7.356E 01	2.586E-03	4.332E 02	3.014E-03	4.063E-03
7.408E 01	8.947E-01	4.341E 02	3.038E-03	4.879E-03
7.774E 01	2.237E 00	4.363E 02	3.103E-03	7.831E-03
8.164E 01	2.504E 00	4.388E 02	3.026E-03	5.594E-03
8.445E 01	1.054E 00	4.399E 02	2.984E-03	4.701E-03
8.731E 01	4.569E-01	4.403E 02	3.017E-03	6.162E-03
8.731E 01	0.000	4.403E 02	3.017E-03	6.165E-03

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1515. (LBF)  
 MEASURED THRUST..... 1407. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 2002. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1800. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.6062  
 MEASURED THRUST COEFFICIENT..... 0.5932

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 6616. (LBF)  
 NET THRUST..... 1601. (LBF)  
 SPECIFIC IMPULSE..... 2115. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.6098

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 115.2 (LBF)  
 INLET MOMENTUM CHANGE..... -728.1 (LBF)  
 COMBUSTOR FRICTION DRAG..... 278.2 (LBF)  
 COMBUSTOR STRUT DRAG..... 823 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 1026 (LBF)  
 NOZZLE FRICTION DRAG..... 46.95 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1217. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1268. (LBF)  
 EXTERNAL FRICTION DRAG..... 6149 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -981. (LBF)  
 TOTAL EXTERNAL DRAG..... -1083 (LBF)  
 CAVITY FORCE..... 823 (LBF)  
 CALCULATED LOAD CELL FORCE..... -1163. (LBF)  
 MEASURED LOAD CELL FORCE..... -691. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0, -165.1, -123.2.

## STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3368 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.221 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.561 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.313 (IN)  
 STRUT LEADING EDGE..... 56.477 (IN)  
 STRUT TRAILING EDGE..... 65.077 (IN)  
 COMBUSTOR EXIT..... 65.077 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9831  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1629  
 DELTA PT2..... 0.1175 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.4000  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1692  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8964  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9051  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9396  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8867  
 ENTHALPY AT P0 = SUPERSONIC..... -4.76 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 30.89 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0283  
 EQUIVALENCE RATIO..... 0.847  
 COMBUSTOR EFFICIENCY..... 0.898  
 TOTAL PRESSURE RATIO..... 0.1406  
 COMBUSTOR EFFECTIVENESS..... 0.8109  
 INJECTOR DISCHARGE COEFFICIENTS 0.8024, 0.7074, 0.7800, 0.6937

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9382  
 NOZZLE COEFFICIENT = C7..... 0.9391  
 PROCESS EFFICIENCY..... 0.8405  
 KINETIC ENERGY EFFICIENCY..... 0.8999

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.322	B
1C	44.300	
2A	46.797	D
2C	46.250	E
3A	54.087	
3B	56.272	
4	44.822	

Reading, 54

$t = 200,56 \text{ sec.}$

READING = 0054 BLOCK = 115 TIME = 200.558 MACH 0.0 PT = 705.999 TT = 2975.9  
RAMJET PERFORMANCE

S U M M A R Y R E P O R T

	P	T	M	S	GAMPA	POLMT	SONV	MACH	VEL	S	M/A	"	A/AC	MUM1M	U	IVAC	PHI	ETAC
WIND TUNNEL	1		0	5														
0.000	705.999	2976	62.1( 787)	1.2934	28.972	2570												
0.000	0.308	402	-32.4( 96)	1.3908	28.971	982	6.000	5895	1.825	0.10595	26.668	0.9827	4903	9.706	186.9			
SPIKE TIP N3	2		0	4														
0.600	18.037	2976	62.1( 787)	1.2933	28.971	2570												
0.600	16.313	2909	641.8( 767)	1.2935	28.972	2543	0.396	1008	2.080	0.10593	26.668	0.9827	4941	1.659	185.3			
WIND TUNNEL	3		0	0														
0.000	745.999	2976	62.1( 787)	1.2934	28.972	2870												
0.000	0.360	400	-32.8( 96)	1.3908	28.971	980	6.015	5897	1.825	0.10484	26.390	0.9827	4932	9.608	186.9			
SPIKE TIP N8	4		0	0														
0.600	16.037	2976	62.1( 787)	1.2933	28.971	2570												
0.600	16.354	2910	62.3( 788)	1.2934	28.971	2544	0.391	995	2.080	0.10484	26.390	0.9827	4933	1.621	186.9			
INLET THROAT	5		0	4														
40.400	293.582	2925	646.9( 772)	1.2930	28.972	2550												
40.400	15.672	1430	223.7( 352)	1.3518	28.971	1822	2.526	4602	1.884	0.94526	26.668	0.1101	4256	67.600	199.6			
INLET UPBASK	6		0	3														
40.400	293.582	2925	646.9( 772)	1.2930	28.972	2550												
40.400	13.463	1375	209.1( 338)	1.3531	28.971	1788	2.618	4681	1.884	0.85933	26.668	0.1212	4297	62.506	161.1			
INLET DOWNBASK	7		0	4														
40.400	123.125	2926	646.9( 772)	1.2930	28.972	2950												
40.400	105.773	2826	616.9( 743)	1.2982	28.972	2509	0.488	1224	1.943	0.85933	26.668	0.1212	4297	16.351	161.1			
COMBUSTOR	8		1	21														
40.410	240.975	2890	650.9( 797)	1.2974	27.631	2597												
40.410	12.994	1411	214.4( 364)	1.3542	27.630	1854	2.521	4674	1.971	0.94873	26.769	0.1102	4255	68.907	199.0	0.11	0.07	
COMBUSTOR	9		2	21														
41.352	171.841	2820	655.7( 812)	1.3014	26.343	2632												
41.352	18.301	1632	287.1( 445)	1.3403	26.343	2035	2.111	4295	2.063	0.95371	26.873	0.1100	4103	63.653	192.7	0.23	0.04	
COMBUSTOR	10		3	21														
41.362	179.742	2774	655.7( 798)	1.3036	26.295	2615												
41.362	18.358	1584	287.8( 432)	1.3471	26.295	2009	2.136	4290	2.055	0.95293	26.873	0.1101	4101	63.536	192.6	0.23	0.01	
COMBUSTOR	11		4	21														
41.427	178.151	2766	655.4( 795)	1.3039	26.288	2612												
41.427	18.724	1591	292.0( 434)	1.3488	26.288	2013	2.118	4264	2.055	0.95337	26.873	0.1101	4090	63.182	192.2	0.23	0.00	
COMBUSTOR	12		5	21														
41.500	175.514	2764	655.1( 795)	1.3040	26.287	2611												
41.500	19.510	1613	298.7( 440)	1.3458	26.287	2026	2.084	4223	2.056	0.95398	26.873	0.1100	4077	62.606	191.7	0.23	0.00	
COMBUSTOR	13		6	21														
42.460	148.249	2748	650.0( 790)	1.3046	26.287	2604												
42.460	22.651	1738	335.9( 477)	1.3400	26.286	2099	1.889	3964	2.067	0.94502	26.873	0.1110	3955	58.224	147.2	0.23	0.00	
COMBUSTOR	14		7	5														
44.147	111.242	3010	638.0( 869)	1.2919	26.603	2696												
44.147	37.624	2339	422.3( 656)	1.3143	26.603	2397	1.371	3285	2.110	0.90972	26.873	0.1153	3855	46.443	143.5	0.23	0.24	
COMBUSTOR	15		8	2														
44.310	110.093	3013	636.7( 870)	1.2917	26.610	2697												
44.310	38.298	2357	425.8( 662)	1.3136	26.611	2405	1.351	3248	2.111	0.90881	26.873	0.1154	3846	45.879	143.1	0.23	0.24	
COMBUSTOR	16		9	2														
44.800	106.726	3010	632.3( 868)	1.2916	26.621	2695												
44.800	40.322	2401	436.4( 676)	1.3120	26.622	2426	1.291	3131	2.113	0.90560	26.873	0.1159	3812	44.065	141.6	0.23	0.25	
COMBUSTOR	17		10	2														
44.862	106.533	3003	631.8( 866)	1.2920	26.615	2692												
44.862	40.227	2395	436.2( 674)	1.3123	26.616	2423	1.291	3128	2.112	0.90496	26.873	0.1159	3808	43.996	141.7	0.23	0.25	
COMBUSTOR	18		11	9														
46.250	98.239	2687	633.0( 823)	1.3076	24.558	2667												
46.250	38.101	2139	448.7( 640)	1.3263	24.558	2397	1.267	3037	2.209	0.85951	27.043	0.1228	3751	40.562	136.7	0.42	0.06	

READING = 0.054 FLICK = 115 TIME = 200.558 MACH 6.0 PI = 745.999 TI = 2975.4

	P	T	M	GAMMA	MOLWT	BDNV	MACH	VEL	Q	A/A	M	A/C	MUMIM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	98.188	2688	632.9( 823)	1.3076	24.559	2667							3752	40.541	138.7	0.42	0.06
46.260	38.085	2140	448.6( 640)	1.3262	24.559	2397	1.267	3037	2.209	0.85900	27.043	0.1229					
COMBUSTOR	0	20	13	4													
47.310	92.017	2765	622.4( 848)	1.3037	24.663	2693							3792	37.791	140.2	0.42	0.11
47.310	36.077	2217	437.3( 664)	1.3222	24.663	2431	1.292	3043	2.221	0.79905	27.043	0.1321					
COMBUSTOR	0	21	14	2													
47.367	91.554	2774	621.6( 850)	1.3032	24.674	2699							3798	37.582	140.4	0.42	0.11
47.367	36.346	2226	436.3( 667)	1.3218	24.674	2435	1.251	3046	2.222	0.79404	27.043	0.1330					
COMBUSTOR	0	22	15	4													
48.110	87.787	2847	614.7( 874)	1.2996	24.766	2725							3856	36.230	142.6	0.42	0.16
48.110	33.649	2270	416.6( 680)	1.3191	24.766	2452	1.278	3133	2.231	0.74423	27.043	0.1419					
COMBUSTOR	0	23	16	7													
48.827	83.071	2826	620.5( 866)	1.3112	22.700	2746							3922	34.907	143.9	0.66	0.07
48.827	29.054	2033	407.3( 654)	1.3319	22.700	2435	1.341	3267	2.357	0.68563	27.255	0.1352					
COMBUSTOR	0	24	17	2													
48.837	82.993	2828	620.4( 867)	1.3111	22.702	2747							3924	34.777	144.0	0.66	0.08
48.837	29.021	2035	407.0( 655)	1.3318	22.701	2436	1.342	3268	2.357	0.68474	27.255	0.1354					
COMBUSTOR	0	25	18	4													
49.367	79.458	2720	616.1( 899)	1.3067	22.794	2784							3995	33.298	146.6	0.66	0.11
49.367	27.279	2102	392.4( 677)	1.3281	22.794	2468	1.356	3346	2.371	0.64040	27.255	0.1662					
COMBUSTOR	0	26	19	5													
50.777	69.905	3032	605.9(1008)	1.2918	23.105	2903							4176	28.986	153.2	0.66	0.22
50.777	28.856	2802	372.5( 778)	1.3133	23.105	2605	1.312	3417	2.410	0.54579	27.255	0.1990					
COMBUSTOR	0	27	20	4													
52.877	64.527	3215	593.5(1072)	1.2825	23.309	2965							4400	26.856	161.4	0.66	0.29
52.877	18.600	2418	296.4( 780)	1.3101	23.311	2600	1.483	3856	2.430	0.44734	27.255	0.2379					
COMBUSTOR	0	28	21	4													
53.377	61.845	3312	591.0(1106)	1.2775	23.411	2998							4443	25.707	163.0	0.66	0.33
53.377	18.233	2523	293.9( 816)	1.3051	23.414	2644	1.458	3855	2.441	0.42906	27.255	0.2480					
COMBUSTOR	0	29	22	4													
54.127	60.065	3374	587.2(1128)	1.2742	23.481	3017							4505	24.863	165.3	0.66	0.35
54.127	17.132	2547	274.5( 823)	1.3033	23.485	2651	1.492	3956	2.447	0.40445	27.255	0.2631					
COMBUSTOR	0	30	23	3													
54.887	58.779	3414	583.7(1142)	1.2719	23.530	3029							4562	24.155	167.4	0.66	0.37
54.887	15.712	2542	253.6( 821)	1.3028	23.535	2645	1.536	4064	2.451	0.38246	27.255	0.2782					
COMBUSTOR	0	31	24	3													
55.760	57.822	3437	579.9(1151)	1.2705	23.563	3036							4620	23.462	169.5	0.66	0.38
55.760	14.158	2511	229.0( 809)	1.3035	23.568	2627	1.595	4190	2.454	0.36032	27.255	0.2953					
COMBUSTOR	0	32	25	5													
56.312	45.606	3822	577.7(1289)	1.2875	23.965	3145							4772	18.730	175.1	0.66	0.52
56.312	13.176	2547	230.6( 960)	1.2826	23.985	2799	1.489	4167	2.496	0.28920	27.255	0.3679					
COMBUSTOR	0	33	26	5													
56.367	52.467	3496	577.4(1171)	1.2671	23.628	3053							4775	20.199	175.2	0.66	0.40
56.367	10.139	2523	171.6( 776)	1.3058	23.635	2580	1.747	4506	2.465	0.28844	27.255	0.3689					
COMBUSTOR	0	34	27	2													
56.507	52.443	3498	576.9(1172)	1.2670	23.632	3054							4783	20.123	175.5	0.66	0.40
56.507	10.014	2518	168.4( 774)	1.3059	23.639	2577	1.754	4521	2.465	0.28641	27.255	0.3715					
COMBUSTOR	0	35	28	6													
56.587	46.715	3793	576.6(1278)	1.2494	23.937	3137							4787	19.089	175.6	0.66	0.51
56.587	12.666	2881	217.0( 936)	1.2854	23.956	2772	1.530	4242	2.492	0.28457	27.255	0.3675					
COMBUSTOR	0	36	29	3													
56.867	47.640	3765	575.6(1268)	1.2512	23.410	3130							4801	19.329	176.2	0.66	0.50
56.867	12.187	2818	204.4( 914)	1.2881	23.927	2746	1.569	4309	2.489	0.28861	27.255	0.3687					
COMBUSTOR	0	37	30	3													
57.093	48.272	3749	574.7(1262)	1.2521	23.896	3125							4812	19.479	176.5	0.66	0.49
57.093	11.899	2781	196.4( 901)	1.2896	23.412	2731	1.593	4351	2.487	0.28807	27.255	0.3694					

READING = 0054 BLOCK = 115 TIME = 200.558 MACH 6.0 PI = 745.999 TI = 2915.0

	P	T	M	4	GAMMA	MOLWT	SONY	MACH	VEL	S	W/A	M	AZAC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4														
57.817	49.747	3698	572.2(1244)	1.2552	23.649	3111												
57.817	10.975	2669	173.7( 861)	1.2642	23.663	2663	1.665	4465	2.441	0.28355	27.255	0.3753		4837	19.676	177.5	0.66	0.48
COMBUSTOR	0	39	32	6														
58.837	90.658	2953	564.2( 978)	1.2944	23.122	2867												
58.837	5.312	1491	50.5( 463)	1.3504	23.122	2081	2.446	5095	2.377	0.28175	27.255	0.3777		4849	22.307	177.9	0.66	0.23
COMBUSTOR	0	40	33	6														
60.847	44.403	4109	564.0(1392)	1.2274	24.314	3212												
60.847	15.425	3343	242.8(1100)	1.2621	24.359	2935	1.366	4009	2.510	0.29155	27.255	0.3650		4836	18.163	177.5	0.66	0.64
COMBUSTOR	0	41	34	3														
62.267	45.035	4137	560.1(1402)	1.2854	24.355	3217												
62.267	16.362	3901	249.4(1121)	1.2591	24.402	2954	1.335	3942	2.509	0.29945	27.255	0.3553		4829	18.346	177.2	0.66	0.65
COMBUSTOR	0	42	35	4														
64.731	40.919	4291	552.5(1457)	1.2127	24.550	3246												
64.731	18.372	3710	293.7(1234)	1.2413	24.614	3050	1.180	3599	2.522	0.28385	27.255	0.3749		4812	15.874	176.6	0.66	0.72
COMBUSTOR	0	43	36	4														
65.107	37.319	4269	551.2(1466)	1.2055	24.643	3260												
65.107	19.371	3894	331.3(1302)	1.2295	24.714	3103	1.069	3317	2.532	0.26388	27.255	0.4032		4810	13.602	176.5	0.66	0.76
COMBUSTOR	44	37	21															
65.107	37.319	4525	634.4(1547)	1.1955	24.594	3307												
65.107	34.228	4460	601.0(1522)	1.1965	24.611	3286	0.393	1291	2.551	0.26388	27.255	0.4032		4629	5.296	169.8	0.66	0.76
NOZZLE	AE	45	38	5														
67.243	37.519	4369	551.2(1464)	1.2055	24.643	3260												
67.243	1.073	2104	452.0( 647)	1.3044	24.757	2347	2.864	6723	2.532	0.05493	27.255	1.9371		6227	5.739	228.5	0.66	0.76
NOZZLE	PU	46	39	5														
67.243	37.519	4369	551.2(1464)	1.2055	24.643	3260												
67.243	0.365	1647	450.5( 494)	1.3251	24.757	2093	3.474	7272	2.532	0.02727	27.255	3.0016		6545	3.082	240.1	0.66	0.76
NOZZLE	AE	47	40	5														
67.243	37.519	4525	634.4(1547)	1.1955	24.594	3307												
67.243	1.123	2244	403.4( 696)	1.2989	24.757	2419	2.831	6850	2.551	0.05493	27.255	1.9371		6360	5.846	233.4	0.66	0.76
NOZZLE	PU	48	41	5														
67.243	37.519	4525	634.4(1547)	1.1955	24.594	3307												
67.243	0.365	1743	473.8( 526)	1.3203	24.757	2150	3.468	7447	2.551	0.02639	27.255	4.0326		6706	3.054	246.1	0.66	0.76
FICTIVE	COMBUSTOR	49	61	0														
65.107	293.582	4972	551.2(1707)	1.1898	25.351	3406												
65.107	0.365	1227	409.3( 353)	1.3427	25.366	1790	4.777	8549	2.379	0.04445	27.255	2.3940		7478	5.905	274.4	0.66	1.00
FICTIVE	NOZZLE	64	62	0														
67.243	25.877	4315	529.8(1465)	1.2046	24.641	3239												
67.243	1.281	2355	484.6( 735)	1.2947	24.757	2474	2.548	6305	2.557	0.05493	27.255	1.9371		5976	5.382	219.3	0.66	0.76





XAB	PeIB	P=OB	PCA	UOX	U=IB	Q=OB	CANALL	P=IB/P80	P=IR/PTO	P=OB/P80	P=OB/PTO
3.004E 01	5.512E 00	5.512E 00	2.507E 02	-3.561E 03	-1.509E 03	-1.972E 03	3.532E 03	1.430E 01	7.309E-03	1.430E 01	7.309E-03
6.085E 01	1.542E 01	1.542E 01	2.571E 02	-3.705E 03	-1.630E 03	-2.075E 03	3.790E 03	4.001E 01	2.068E-02	4.001E 01	2.068E-02
6.227E 01	1.630E 01	1.630E 01	2.571E 02	-3.711E 03	-1.656E 03	-2.155E 03	3.972E 03	4.245E 01	2.193E-02	4.245E 01	2.193E-02
6.473E 01	1.837E 01	1.837E 01	2.571E 02	-4.017E 03	-1.718E 03	-2.300E 03	4.209E 03	4.766E 01	2.463E-02	4.766E 01	2.463E-02
6.811E 01	2.006E 01	1.868E 01	2.571E 02	-4.933E 03	-1.729E 03	-2.324E 03	4.332E 03	5.204E 01	2.689E-02	4.846E 01	2.504E-02
6.935E 01	2.006E 01	1.871E 01	2.571E 02	-4.987E 03	-1.730E 03	-2.327E 03	4.342E 03	5.204E 01	2.689E-02	4.846E 01	2.508E-02
6.935E 01	2.006E 01	1.887E 01	2.571E 02	-4.987E 03	-1.736E 03	-2.339E 03	4.368E 03	4.926E 01	2.565E-02	4.896E 01	2.530E-02
6.701E 01	1.008E 01	9.650E 00	4.170E 02	-4.206E 03	-1.776E 03	-2.429E 03	4.583E 03	2.613E 01	1.351E-02	2.503E 01	1.294E-02
6.768E 01	7.312E 00	9.142E 00	6.000E 02	-4.249E 03	-1.789E 03	-2.460E 03	4.665E 03	1.897E 01	9.801E-03	2.372E 01	1.226E-02
6.645E 01	4.130E 00	6.922E 00	7.868E 02	-4.286E 03	-1.800E 03	-2.496E 03	4.760E 03	1.071E 01	5.536E-03	1.796E 01	9.262E-03
6.917E 01	3.302E 00	4.890E 00	9.084E 02	-4.340E 03	-1.809E 03	-2.532E 03	4.849E 03	8.505E 00	4.426E-03	1.238E 01	6.501E-03
6.978E 01	2.600E 00	4.048E 00	9.874E 02	-4.376E 03	-1.814E 03	-2.562E 03	4.922E 03	6.749E 00	3.485E-03	1.050E 01	5.427E-03
7.073E 01	1.946E 00	2.800E 00	1.076E 03	-4.430E 03	-1.822E 03	-2.609E 03	5.035E 03	5.048E 00	2.809E-03	7.264E 00	3.753E-03
7.116E 01	1.650E 00	2.582E 00	1.108E 03	-4.452E 03	-1.824E 03	-2.628E 03	5.086E 03	4.280E 00	2.212E-03	6.697E 00	3.461E-03
7.269E 01	1.213E 00	1.805E 00	1.192E 03	-4.510E 03	-1.832E 03	-2.678E 03	5.273E 03	3.146E 00	1.626E-03	4.682E 00	2.420E-03
7.269E 01	1.170E 00	1.628E 00	1.198E 03	-4.514E 03	-1.833E 03	-2.682E 03	5.290E 03	3.035E 00	1.568E-03	4.682E 00	2.420E-03
7.359E 01	1.188E 00	7.400E-01	1.238E 03	-4.592E 03	-1.836E 03	-2.702E 03	5.374E 03	3.082E 00	1.593E-03	1.920E 00	9.920E-04
7.359E 01	1.188E 00	7.353E-01	1.206E 03	-4.534E 03	-1.836E 03	-2.702E 03	5.375E 03	3.082E 00	1.593E-03	1.907E 00	9.856E-04
7.492E 01	1.220E 00	0.000	1.255E 03	-4.567E 03	-1.842E 03	-2.749E 03	5.426E 03	3.183E 00	1.635E-03	0.000	0.000
7.777E 01	1.955E 00	0.000	1.329E 03	-4.597E 03	-1.852E 03	-2.745E 03	5.525E 03	3.072E 00	2.621E-03	0.000	0.000
8.167E 01	1.505E 00	0.000	1.433E 03	-4.608E 03	-1.863E 03	-2.745E 03	5.630E 03	3.904E 00	2.017E-03	0.000	0.000
8.448E 01	1.190E 00	0.000	1.433E 03	-4.618E 03	-1.873E 03	-2.749E 03	5.689E 03	3.087E 00	1.595E-03	0.000	0.000
8.734E 01	1.535E 00	0.000	1.466E 03	-4.636E 03	-1.891E 03	-2.745E 03	5.707E 03	3.932E 00	2.038E-03	0.000	0.000
8.734E 01	1.536E 00	0.000	1.466E 03	-4.636E 03	-1.891E 03	-2.745E 03	5.707E 03	3.932E 00	2.038E-03	0.000	0.000

ORIGINAL PAGE IS  
OF POOR QUALITY

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 005, CLOCK = 115, TIME = 200.558, MAGN = 0.0, FI = 745.499, TI = 2973.67

X	DDRG	CORAG	CF	HC
4.040E 01	1.160E 02	1.160E 02	2.200E 03	4.340E 02
4.041E 01	1.901E 01	1.162E 02	2.517E 03	3.648E 02
4.135E 01	1.924E 01	1.354E 02	2.695E 03	4.552E 02
4.136E 01	1.919E 01	1.356E 02	2.667E 03	4.871E 02
4.143E 01	1.203E 00	1.368E 02	2.439E 03	4.973E 02
4.150E 01	1.347E 00	1.381E 02	2.446E 03	5.104E 02
4.244E 01	1.725E 01	1.554E 02	2.528E 03	5.412E 02
4.415E 01	2.761E 01	1.830E 02	2.640E 03	6.832E 02
4.431E 01	2.493E 00	1.855E 02	2.809E 03	6.467E 02
4.480E 01	9.399E 01	1.940E 02	2.824E 03	6.507E 02
4.486E 01	1.132E 01	2.152E 02	3.083E 03	6.479E 02
4.625E 01	2.152E 01	2.152E 02	3.083E 03	5.796E 02
4.626E 01	1.483E 01	2.303E 02	2.735E 03	6.243E 02
4.731E 01	9.998E 01	2.313E 02	2.792E 03	6.096E 02
4.739E 01	9.229E 00	2.405E 02	2.762E 03	5.831E 02
4.883E 01	9.272E 00	2.498E 02	3.060E 03	4.962E 02
4.884E 01	1.260E 01	2.499E 02	2.731E 03	5.548E 02
4.937E 01	6.137E 01	2.561E 02	2.693E 03	5.347E 02
5.078E 01	1.486E 01	2.709E 02	2.682E 03	4.992E 02
5.288E 01	2.008E 01	2.910E 02	2.725E 03	3.928E 02
5.338E 01	4.642E 00	2.937E 02	2.824E 03	3.747E 02
5.413E 01	6.662E 00	3.028E 02	2.841E 03	3.509E 02
5.489E 01	6.782E 00	3.093E 02	2.843E 03	3.288E 02
5.576E 01	7.580E 00	3.169E 02	2.831E 03	3.037E 02
5.631E 01	2.675E 00	3.198E 02	2.790E 03	2.748E 02
5.637E 01	3.930E 01	3.201E 02	2.942E 03	2.232E 02
5.631E 01	1.023E 01	3.212E 02	2.769E 03	2.322E 02
5.659E 01	5.995E 01	3.218E 02	3.206E 03	2.343E 02
5.687E 01	2.101E 00	3.239E 02	2.925E 03	2.501E 02
5.709E 01	1.630E 00	3.255E 02	2.901E 03	2.481E 02
5.782E 01	5.231E 00	3.307E 02	2.866E 03	2.375E 02
5.842E 01	7.799E 00	3.385E 02	2.817E 03	1.523E 02
6.085E 01	1.395E 01	3.525E 02	2.530E 03	3.284E 02
6.227E 01	9.292E 00	3.618E 02	3.055E 03	2.808E 02
6.473E 01	1.672E 01	3.785E 02	3.123E 03	2.836E 02
6.511E 01	2.266E 00	3.807E 02	3.251E 03	2.695E 02
6.515E 01	2.303E 01	3.810E 02	3.347E 03	2.726E 02
6.535E 01	1.175E 01	3.822E 02	3.340E 03	2.711E 02
6.701E 01	1.017E 01	3.923E 02	3.198E 03	2.046E 02
6.768E 01	3.641E 00	3.962E 02	3.165E 03	1.842E 02
6.845E 01	4.070E 00	4.002E 02	3.100E 03	1.434E 02
6.917E 01	3.268E 00	4.035E 02	3.051E 03	1.167E 02
6.978E 01	2.457E 00	4.060E 02	3.019E 03	1.012E 02
7.073E 01	3.306E 00	4.093E 02	2.988E 03	7.933E 03
7.116E 01	1.325E 00	4.104E 02	2.951E 03	7.293E 03
7.269E 01	4.130E 00	4.147E 02	2.901E 03	5.663E 03
7.284E 01	3.404E 01	4.151E 02	2.889E 03	5.347E 03
7.359E 01	1.458E 01	4.165E 02	2.830E 03	4.019E 03
7.459E 01	2.470E 01	4.162E 02	2.829E 03	4.012E 03
7.492E 01	6.528E 01	4.174E 02	2.891E 03	4.800E 03
7.777E 01	2.010E 00	4.194E 02	2.911E 03	6.803E 03
8.167E 01	2.264E 00	4.217E 02	2.853E 03	5.555E 03
8.404E 01	1.607E 00	4.227E 02	2.806E 03	4.627E 03
8.734E 01	4.145E 01	4.231E 02	2.830E 03	5.585E 03
8.734E 01	0.000	4.231E 02	2.830E 03	5.585E 03

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 990. (LBF)  
 MEASURED THRUST..... 990. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1697. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1698. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.3982  
 MEASURED THRUST COEFFICIENT..... 0.4008

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 6104. (LBF)  
 NET THRUST..... 1117. (LBF)  
 SPECIFIC IMPULSE..... 1904. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.4495

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 116.0 (LBF)  
 INLET MOMENTUM CHANGE..... -729.9 (LBF)  
 COMBUSTOR FRICTION DRAG..... 264.8 (LBF)  
 COMBUSTOR STRUT DRAG..... -1.59 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 554. (LBF)  
 NOZZLE FRICTION DRAG..... 42.34 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1166. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1208. (LBF)  
 EXTERNAL FRICTION DRAG..... 61.53 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -975. (LBF)  
 TOTAL EXTERNAL DRAG..... -1037. (LBF)  
 TOTAL STRUT DRAG..... -1.59 (LBF)  
 CAVITY FORCE..... -1240. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1287. (LBF)  
 MEASURED LOAD CELL FORCE..... -1280. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0, -164.4, -122.8.

## STATIONS

NOMINAL COMB. LEADING EDGE..... 34.884 (IN)  
 SPIRE TRANSLATION..... 0.3667 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COMB. LEADING EDGE..... 35.251 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.591 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.343 (IN)  
 STRUT LEADING EDGE..... 56.507 (IN)  
 STRUT TRAILING EDGE..... 65.107 (IN)  
 COMBUSTOR EXIT..... 65.107 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9827  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1627  
 DELTA PT2..... 0.1181 (P81)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3935  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1650  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8954  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9053  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9395  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8895  
 ENTHALPY AT P0 = SUPERSONIC..... -5.58 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 39.14 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0220  
 EQUIVALENCE RATIO..... 0.658  
 COMBUSTOR EFFICIENCY..... 0.761  
 TOTAL PRESSURE RATIO..... 0.1278  
 COMBUSTOR EFFECTIVENESS..... 0.7104  
 INJECTOR DISCHARGE COEFFICIENTS 0.6475, 0.6985, 0.7941, 0.7051

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9897  
 NOZZLE COEFFICIENT = C7..... 0.9939  
 PROCESS EFFICIENCY..... 0.9128  
 KINETIC ENERGY EFFICIENCY..... 0.9103

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.552	B
1C	44.300	
2A	48.827	D
2C	46.250	E
3A	54.117	
3B	56.302	
4	44.852	

Reading 54

$t = 222.16 \text{ sec.}$

READING = 0054 CLOCK = 139 TIME = 222.158 MACH 0.0 PI = 705.999 II = 24/1.5  
RAJUT PERFORMANCE

SUMMARY REPORT

P	T	H	GAMMA	MOL-T	SUNV	MACH	VEL	S	W/A	A/C	MUMK	G	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5												
0.000	745.999	2972	660.8( 780)	1.2936	28.972	2568									
0.000	0.385	401	-32.6( 90)	1.3988	28.971	981	0.002	5890	1.824	0.10593	26.672	0.9830	4980	9.697	186.7
SPIKE TIP	NS	2	0												
0.600	18.025	2972	660.8( 780)	1.2934	28.971	2568									
0.600	16.302	2904	640.5( 760)	1.2956	28.972	2541	0.396	1007	2.080	0.10593	26.672	0.9830	4939	1.657	185.2
WIND TUNNEL	3	0	0												
0.000	745.999	2972	660.8( 780)	1.2936	28.972	2568									
0.000	0.379	400	-33.0( 90)	1.3988	28.971	979	0.017	5892	1.824	0.10486	26.402	0.9830	4930	9.601	186.7
SPIKE TIP	NS	4	0												
0.600	18.025	2972	660.8( 780)	1.2934	28.971	2568									
0.600	16.342	2906	641.0( 767)	1.2956	28.972	2542	0.391	995	2.080	0.10486	26.402	0.9830	4931	1.621	186.8
INLET THROAT	3	0	3												
40.400	297.294	2916	644.0( 770)	1.2953	28.972	2546									
40.400	15.508	1417	220.0( 349)	1.3526	28.971	1613	2.540	4606	1.882	0.94541	26.672	0.1101	4286	67.674	159.6
INLET UPN8K	6	0	3												
40.400	297.294	2916	644.0( 770)	1.2953	28.972	2546									
40.400	13.326	1361	205.6( 334)	1.3559	28.971	1780	2.632	4684	1.882	0.85947	26.672	0.1212	4297	62.862	161.1
INLET DN8K	7	0	4												
40.400	123.149	2916	644.0( 770)	1.2953	28.972	2546									
40.400	105.865	2817	614.3( 741)	1.2985	28.972	2505	0.487	1220	1.942	0.85947	26.672	0.1212	4297	16.292	161.1
COMBUSTOR	0	8	1	21											
40.410	241.456	2880	649.0( 797)	1.2978	27.519	2599									
40.410	12.637	1422	217.1( 363)	1.3537	27.519	1865	2.443	4649	1.976	0.94920	26.783	0.1102	4255	68.577	158.9
COMBUSTOR	0	9	2	21											
41.352	169.828	2808	654.1( 811)	1.3020	26.230	2632									
41.352	16.932	1665	297.7( 457)	1.3429	26.230	2036	2.051	4223	2.070	0.93421	26.887	0.1100	4091	62.620	152.1
COMBUSTOR	0	10	3	21											
41.362	177.247	2761	654.1( 797)	1.3042	26.182	2615									
41.362	19.999	1617	298.8( 443)	1.3457	26.181	2032	2.075	4218	2.062	0.93343	26.887	0.1101	4089	62.495	152.1
COMBUSTOR	0	11	4	21											
41.427	175.382	2753	653.7( 793)	1.3045	26.174	2612									
41.427	20.434	1624	303.1( 446)	1.3453	26.174	2037	2.056	4188	2.061	0.93387	26.887	0.1101	4076	62.088	151.6
COMBUSTOR	0	12	5	21											
41.500	172.364	2751	653.3( 793)	1.3046	26.173	2611									
41.500	21.320	1648	310.4( 453)	1.3442	26.173	2051	2.019	4142	2.062	0.93448	26.887	0.1100	4062	61.440	151.1
COMBUSTOR	0	13	6	21											
42.460	130.497	2866	646.9( 828)	1.2990	26.314	2652									
42.460	24.627	1921	348.6( 533)	1.3314	26.314	2198	1.757	3862	2.094	0.94552	26.887	0.1110	3928	56.753	146.1
COMBUSTOR	0	14	7	4											
44.147	104.404	2986	632.8( 865)	1.2928	26.487	2692									
44.147	35.357	2359	430.4( 665)	1.3338	26.488	2412	1.320	3182	2.117	0.91020	26.887	0.1153	3822	45.013	142.1
COMBUSTOR	0	15	8	2											
44.310	107.591	2982	631.3( 863)	1.2930	26.488	2690									
44.310	35.779	2366	432.4( 667)	1.3336	26.488	2415	1.306	3155	2.117	0.90929	26.887	0.1154	3813	44.578	141.8
COMBUSTOR	0	16	9	2											
44.800	105.028	2980	626.8( 856)	1.2938	26.479	2681									
44.800	41.044	2378	439.2( 671)	1.3333	26.479	2421	1.265	3064	2.117	0.90607	26.887	0.1159	3778	43.141	140.5
COMBUSTOR	0	17	10	2											
44.862	104.948	2949	626.2( 853)	1.2943	26.469	2678									
44.862	40.770	2366	438.2( 669)	1.3338	26.470	2416	1.270	3087	2.116	0.90546	26.887	0.1159	3774	43.160	140.4
COMBUSTOR	0	18	11	7											
46.250	100.235	2683	621.2( 800)	1.3069	25.240	2628									
46.250	34.608	2077	422.8( 605)	1.3276	25.240	2331	1.352	3151	2.160	0.85752	26.980	0.1228	3731	41.987	138.3

READING = 0054 HLOCK = 139 TIME = 222.158 MACH 0.0 PT = 705.999 TT = 2971.5

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/C	MUMTH	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	100.210	2683	521.1	800	1.3069	25.240	2628						3731	41.980	138.3	0.34	0.06
46.260	34.564	2076	422.5	603	1.3276	25.240	2330	1.353	3152	2.180	0.85701	26.980	0.1229				
COMBUSTOR	0	20	13	3													
47.310	97.024	2680	411.2	799	1.3067	25.266	2625						3770	40.752	139.7	0.34	0.07
47.310	29.903	2017	399.0	584	1.3295	25.266	2297	1.432	3289	2.161	0.79720	26.980	0.1321				
COMBUSTOR	0	21	14	2													
47.387	96.806	2682	610.5	800	1.3066	25.270	2626						3775	40.650	139.9	0.34	0.07
47.387	29.548	2014	392.6	583	1.3296	25.270	2295	1.439	3302	2.162	0.79220	26.980	0.1330				
COMBUSTOR	0	22	15	2													
48.110	96.308	2673	604.0	796	1.3068	25.280	2621						3827	40.000	141.8	0.34	0.08
48.110	28.319	1934	363.8	598	1.3325	25.280	2251	1.540	3466	2.181	0.74281	26.980	0.1419				
COMBUSTOR	0	23	16	5													
48.827	89.831	2583	605.0	807	1.3117	23.964	2651						3885	37.895	143.3	0.49	0.06
48.827	23.153	1853	357.5	560	1.3377	23.964	2267	1.552	3519	2.245	0.68190	27.110	0.1552				
COMBUSTOR	0	24	17	2													
48.837	89.771	2584	604.9	807	1.3117	23.965	2652						3886	37.268	143.4	0.49	0.06
48.837	23.119	1853	357.2	560	1.3376	23.965	2268	1.553	3521	2.245	0.68108	27.110	0.1554				
COMBUSTOR	0	25	18	3													
49.267	86.955	2628	600.9	821	1.3096	24.016	2669						3941	35.757	145.4	0.49	0.08
49.267	21.092	1859	340.1	562	1.3368	24.016	2268	1.593	3612	2.252	0.63699	27.110	0.1662				
COMBUSTOR	0	26	19	4													
50.777	75.516	2551	591.2	893	1.2889	24.256	2755						4075	31.160	150.3	0.49	0.18
50.777	19.287	2060	318.5	625	1.3263	24.256	2366	1.561	3693	2.284	0.54288	27.110	0.1950				
COMBUSTOR	0	27	20	4													
52.877	68.165	3008	579.3	946	1.2911	24.442	2810						4244	27.329	156.5	0.49	0.26
52.877	15.000	2107	267.1	638	1.3223	24.442	2381	1.600	3952	2.305	0.44496	27.110	0.2379				
COMBUSTOR	0	28	21	3													
53.377	67.129	3024	576.8	952	1.2902	24.467	2817						4277	26.627	157.8	0.49	0.27
53.377	14.079	2097	254.7	634	1.3224	24.468	2374	1.691	4015	2.307	0.42677	27.110	0.2480				
COMBUSTOR	0	29	22	4													
54.127	63.919	3099	573.2	977	1.2865	24.551	2842						4324	25.344	159.5	0.49	0.31
54.127	13.478	2157	244.8	653	1.3192	24.552	2801	1.689	4054	2.316	0.40229	27.110	0.2631				
COMBUSTOR	0	30	23	4													
54.887	61.214	3165	569.8	999	1.2832	24.627	2863						4368	24.219	161.1	0.49	0.34
54.887	12.862	2208	234.4	669	1.3164	24.629	2422	1.691	4097	2.324	0.38042	27.110	0.2782				
COMBUSTOR	0	31	24	3													
55.760	60.269	3180	566.1	1003	1.2823	24.652	2868						4415	23.356	162.9	0.49	0.35
55.760	11.655	2175	214.7	657	1.3173	24.654	2404	1.744	4193	2.326	0.35840	27.110	0.2953				
COMBUSTOR	0	32	25	5													
56.312	46.613	3534	564.0	1123	1.2633	25.030	2978						4553	18.706	167.9	0.49	0.51
56.312	10.892	2568	214.0	784	1.2987	25.039	2573	1.626	4185	2.369	0.28766	27.110	0.3679				
COMBUSTOR	0	33	26	5													
56.367	53.349	3284	563.8	1038	1.2769	24.766	2901						4555	19.704	168.0	0.49	0.40
56.367	8.802	2173	173.5	655	1.3160	24.769	2396	1.844	4419	2.393	0.28690	27.110	0.3689				
COMBUSTOR	0	34	27	3													
56.507	53.274	3287	563.3	1039	1.2767	24.770	2902						4561	19.615	168.3	0.49	0.40
56.507	8.705	2170	171.0	654	1.3161	24.773	2394	1.850	4430	2.393	0.28489	27.110	0.3715				
COMBUSTOR	0	35	28	6													
56.587	47.902	3505	563.0	1113	1.2649	25.002	2969						4565	18.995	168.4	0.49	0.49
56.587	10.512	2507	203.1	764	1.3012	25.009	2546	1.667	4244	2.365	0.28803	27.110	0.3675				
COMBUSTOR	0	36	29	3													
56.867	48.972	3478	562.0	1104	1.2664	24.976	2961						4577	19.170	168.8	0.49	0.48
56.867	10.125	2450	193.0	745	1.3035	24.983	2521	1.704	4297	2.362	0.28708	27.110	0.3687				
COMBUSTOR	0	37	30	2													
57.093	49.298	3479	561.3	1104	1.2664	24.979	2961						4585	19.218	169.1	0.49	0.48
57.093	10.027	2442	189.0	742	1.3036	24.986	2517	1.715	4316	2.361	0.28654	27.110	0.3694				

ADING = 0054 BLOCK = 139 TIME = 222.158 MACH 6.0 PT = 745.999 TT = 2971.5

	P	T	H	GAMMA	MOLAT	SONV	MACH	VEL	S	W/A	N	A/VAC	MUPTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	3													
57.817	49.472	3488	558.9(117)	1.2658	24.996	2963											
57.817	9.712	2429	174.0(738)	1.3040	25.003	2510	1.737	4360	2.361	0.28204	27.110	0.3753	4607	19.111	170.0	0.49	0.49
COMBUSTOR	0	39	32	7													
58.837	82.660	2891	556.1(903)	1.2959	24.390	2763											
58.837	5.437	1467	64.7(438)	1.3498	24.390	2023	2.401	4857	2.277	0.28024	27.110	0.3777	4618	21.154	170.4	0.49	0.24
COMBUSTOR	0	40	33	6													
60.847	46.991	3662	551.3(1160)	1.2554	25.207	3011											
60.847	11.425	2702	198.5(827)	1.2918	25.221	2623	1.602	4202	2.374	0.29000	27.110	0.3650	4609	18.937	170.0	0.49	0.50
COMBUSTOR	0	41	34	5													
62.267	42.834	4006	547.8(1203)	1.2327	28.607	3096											
62.267	15.579	3278	262.6(1023)	1.2649	25.643	2835	1.332	3778	2.396	0.29786	27.110	0.3553	4601	17.487	169.7	0.49	0.74
COMBUSTOR	0	42	35	4													
64.731	39.181	4126	540.8(1324)	1.2232	25.769	3120											
64.731	16.875	3516	293.1(1103)	1.2520	25.817	2911	1.209	3521	2.406	0.28233	27.110	0.3749	4587	15.448	169.2	0.49	0.81
COMBUSTOR	0	43	36	3													
65.107	36.475	4112	539.6(1319)	1.2235	25.758	3116											
65.107	15.530	3496	289.5(1096)	1.2529	25.805	2905	1.218	3538	2.411	0.28248	27.110	0.4032	4585	14.430	169.1	0.49	0.81
COMBUSTOR	0	44	37	4													
65.107	36.475	4341	644.7(1403)	1.2095	25.712	3186											
65.107	18.320	3841	427.3(1220)	1.2347	25.761	3024	1.091	3298	2.436	0.26248	27.110	0.4032	4671	13.453	172.3	0.49	0.81
NOZZLE	AE	45	38	5													
67.343	36.475	4112	539.6(1293)	1.2235	25.758	3116											
67.343	0.966	1883	272.8(549)	1.3160	25.819	2184	2.919	6376	2.411	0.05464	27.110	1.9371	5851	5.414	239.8	0.49	0.81
NOZZLE	PO	46	39	5													
67.343	36.475	4112	539.6(1293)	1.2235	25.758	3116											
67.343	0.385	1502	392.5(427)	1.3351	25.819	1965	3.475	6828	2.411	0.02923	27.110	3.6213	6111	3.102	225.4	0.49	0.81
NOZZLE	AE	47	40	5													
67.343	36.475	4341	644.7(1403)	1.2095	25.712	3186											
67.343	1.030	2065	214.0(605)	1.3084	25.819	2281	2.874	6555	2.436	0.05464	27.110	1.9371	6034	5.866	222.6	0.49	0.81
NOZZLE	PO	48	41	5													
67.343	36.475	4341	644.7(1403)	1.2095	25.712	3186											
67.343	0.385	1628	353.3(460)	1.3281	25.819	2040	3.493	7087	2.436	0.02791	27.110	3.7920	6328	3.065	233.4	0.49	0.81
FICTIVE	COMBUSTOR	68	61	0													
65.107	297.294	4530	539.6(1463)	1.2141	26.259	3227											
65.107	0.385	1016	698.8(279)	1.3607	26.344	1616	4.873	7872	2.260	0.05081	27.110	2.0830	6838	6.216	252.2	0.49	1.00
FICTIVE	NOZZLE	69	62	0													
67.343	28.361	4061	518.9(1300)	1.2245	25.760	3098											
67.343	1.082	2023	227.6(592)	1.3101	25.819	2259	2.706	6112	2.426	0.05464	27.110	1.9371	5867	5.190	209.8	0.49	0.81

XA88	P=18	P=08	PDA	WVA	WIB	Q=08	CAYALL	P=18/P80	P=18/P10	P=08/P80	P=08/P10
0.981E+01	1.020E+00	0.000	-4.391E+01	0.000	0.000	0.000	2.470E+02	2.650E+00	1.367E+03	0.000	0.000
1.636E+01	1.020E+00	0.000	-3.397E+01	0.000	0.000	0.000	1.634E+02	2.650E+00	1.367E+03	0.000	0.000
3.070E+01	2.135E+00	0.000	-1.619E+02	0.000	0.000	0.000	5.053E+02	5.540E+00	5.159E+03	0.000	0.000
3.508E+01	3.049E+00	0.000	-3.558E+02	0.000	0.000	0.000	6.804E+02	1.000E+01	5.159E+03	0.000	0.000
3.524E+01	3.914E+00	5.715E+00	-4.253E+02	0.000	0.000	0.000	6.877E+02	1.017E+01	5.287E+03	1.485E+01	7.661E+03
3.525E+01	3.916E+00	5.678E+00	-4.253E+02	0.000	0.000	0.000	6.880E+02	1.018E+01	5.290E+03	1.475E+01	7.612E+03
3.535E+01	3.938E+00	3.846E+00	-4.438E+02	0.000	0.000	0.000	7.180E+02	1.048E+01	5.409E+03	9.992E+00	5.155E+03
3.606E+01	3.900E+00	2.763E+00	-4.577E+02	0.000	0.000	0.000	7.699E+02	1.033E+01	5.279E+03	4.158E+00	2.145E+03
3.648E+01	4.182E+00	6.172E+00	-6.732E+02	0.000	0.000	0.000	8.135E+02	1.087E+01	5.604E+03	1.903E+01	6.272E+03
3.701E+01	4.315E+00	1.047E+01	-6.831E+02	0.000	0.000	0.000	8.693E+02	1.121E+01	5.784E+03	2.721E+01	1.404E+02
3.706E+01	4.307E+00	1.048E+01	-6.866E+02	0.000	0.000	0.000	8.745E+02	1.119E+01	5.773E+03	2.619E+01	1.454E+02
3.738E+01	4.252E+00	8.212E+00	-6.940E+02	0.000	0.000	0.000	9.089E+02	1.105E+01	5.700E+03	2.134E+01	1.101E+02
3.791E+01	4.161E+00	1.147E+01	-5.100E+02	0.000	0.000	0.000	9.666E+02	1.091E+01	5.578E+03	2.692E+01	1.538E+02
3.803E+01	4.140E+00	1.147E+01	-5.114E+02	0.000	0.000	0.000	9.803E+02	1.076E+01	5.550E+03	2.980E+01	1.537E+02
3.840E+01	4.003E+00	1.144E+01	-5.184E+02	0.000	0.000	0.000	1.021E+03	1.508E+01	6.048E+03	2.973E+01	1.534E+02
3.875E+01	7.799E+00	1.479E+01	-5.261E+02	0.000	0.000	0.000	1.061E+03	2.088E+01	1.045E+02	3.844E+01	1.983E+02
3.887E+01	8.392E+00	1.590E+01	-5.270E+02	0.000	0.000	0.000	1.074E+03	2.181E+01	1.123E+02	4.132E+01	2.131E+02
3.901E+01	9.120E+00	1.610E+01	-5.289E+02	0.000	0.000	0.000	1.091E+03	2.370E+01	1.223E+02	4.183E+01	2.225E+02
3.938E+01	1.555E+01	1.660E+01	-5.353E+02	0.000	0.000	0.000	1.135E+03	4.001E+01	2.084E+02	4.313E+01	2.225E+02
3.950E+01	1.771E+01	1.556E+01	-5.409E+02	0.000	0.000	0.000	1.147E+03	4.602E+01	2.374E+02	4.602E+01	2.085E+02
3.967E+01	1.826E+01	1.243E+01	-5.505E+02	0.000	0.000	0.000	1.190E+03	4.748E+01	2.847E+02	5.235E+01	1.669E+02
4.000E+01	1.845E+01	1.003E+01	-5.678E+02	0.000	0.000	0.000	1.208E+03	4.795E+01	2.874E+02	2.606E+01	1.345E+02
4.037E+01	2.332E+01	3.375E+00	-6.035E+02	0.000	0.000	0.000	1.240E+03	6.006E+01	3.126E+02	8.770E+00	4.524E+03
4.040E+01	2.376E+01	3.378E+01	-6.011E+02	0.000	0.000	0.000	1.252E+03	6.174E+01	3.183E+02	8.778E+00	4.528E+03
4.041E+01	2.389E+01	3.379E+01	-6.021E+02	0.000	0.000	0.000	1.252E+03	6.209E+01	3.183E+02	8.778E+00	4.530E+03
4.041E+01	3.630E+01	3.471E+01	-7.542E+02	0.000	0.000	0.000	1.365E+03	9.437E+01	4.879E+02	9.019E+00	4.654E+03
4.136E+01	3.633E+01	3.472E+01	-7.559E+02	0.000	0.000	0.000	1.365E+03	9.437E+01	4.879E+02	9.019E+00	4.654E+03
4.143E+01	3.730E+01	3.473E+01	-7.673E+02	0.000	0.000	0.000	1.365E+03	9.437E+01	4.879E+02	9.019E+00	4.654E+03
4.150E+01	3.836E+01	4.278E+01	-7.801E+02	0.000	0.000	0.000	1.383E+03	9.908E+01	5.142E+02	1.112E+01	5.735E+03
4.246E+01	3.450E+01	1.475E+01	-8.922E+02	0.000	0.000	0.000	1.496E+03	8.955E+01	4.825E+02	3.834E+01	1.978E+02
4.415E+01	4.556E+01	3.316E+01	-9.759E+02	0.000	0.000	0.000	1.708E+03	1.104E+02	6.107E+02	8.616E+01	4.445E+02
4.431E+01	4.663E+01	3.293E+01	-9.828E+02	0.000	0.000	0.000	1.722E+03	1.212E+02	6.250E+02	8.557E+01	4.414E+02
4.480E+01	4.984E+01	3.225E+01	-1.010E+03	0.000	0.000	0.000	1.785E+03	1.259E+02	6.661E+02	8.380E+01	4.323E+02
4.486E+01	4.938E+01	3.219E+01	-1.013E+03	0.000	0.000	0.000	1.785E+03	1.259E+02	6.661E+02	8.380E+01	4.323E+02
4.625E+01	3.898E+01	3.023E+01	-1.020E+03	0.000	0.000	0.000	1.959E+03	1.233E+02	5.226E+02	7.854E+01	4.051E+02
4.626E+01	3.891E+01	3.022E+01	-1.019E+03	0.000	0.000	0.000	1.959E+03	1.233E+02	5.226E+02	7.854E+01	4.051E+02
4.731E+01	3.105E+01	2.876E+01	-9.655E+02	0.000	0.000	0.000	1.961E+03	1.011E+02	5.216E+02	7.852E+01	4.051E+02
4.739E+01	3.045E+01	2.876E+01	-9.597E+02	0.000	0.000	0.000	2.091E+03	8.088E+01	4.162E+02	7.472E+01	3.855E+02
4.739E+01	3.045E+01	2.876E+01	-9.597E+02	0.000	0.000	0.000	2.091E+03	8.088E+01	4.162E+02	7.472E+01	3.855E+02
4.811E+01	2.475E+01	2.589E+01	-8.933E+02	0.000	0.000	0.000	2.100E+03	7.941E+01	4.081E+02	7.445E+01	3.640E+02
4.883E+01	2.315E+01	2.315E+01	-8.144E+02	0.000	0.000	0.000	2.190E+03	6.431E+01	3.318E+02	6.727E+01	3.470E+02
4.883E+01	2.315E+01	2.315E+01	-8.144E+02	0.000	0.000	0.000	2.190E+03	6.431E+01	3.318E+02	6.727E+01	3.470E+02
4.884E+01	2.311E+01	2.311E+01	-8.132E+02	0.000	0.000	0.000	2.280E+03	6.019E+01	3.104E+02	6.016E+01	3.104E+02
4.937E+01	2.109E+01	2.109E+01	-7.521E+02	0.000	0.000	0.000	2.281E+03	6.006E+01	3.099E+02	6.006E+01	3.099E+02
5.078E+01	1.929E+01	1.929E+01	-6.088E+02	0.000	0.000	0.000	2.348E+03	5.481E+01	2.827E+02	5.481E+01	2.827E+02
5.288E+01	1.500E+01	1.500E+01	-4.141E+02	0.000	0.000	0.000	2.525E+03	5.012E+01	2.585E+02	5.012E+01	2.585E+02
5.338E+01	1.408E+01	1.408E+01	-3.733E+02	0.000	0.000	0.000	2.792E+03	3.898E+01	2.011E+02	3.898E+01	2.011E+02
5.413E+01	1.347E+01	1.347E+01	-3.230E+02	0.000	0.000	0.000	2.855E+03	3.688E+01	1.887E+02	3.688E+01	1.887E+02
5.489E+01	1.266E+01	1.266E+01	-2.719E+02	0.000	0.000	0.000	2.951E+03	3.501E+01	1.806E+02	3.501E+01	1.806E+02
5.574E+01	1.166E+01	1.166E+01	-2.122E+02	0.000	0.000	0.000	3.048E+03	3.342E+01	1.724E+02	3.342E+01	1.724E+02
5.631E+01	1.089E+01	1.089E+01	-1.768E+02	0.000	0.000	0.000	3.161E+03	3.029E+01	1.562E+02	3.029E+01	1.562E+02
5.631E+01	1.089E+01	1.089E+01	-1.768E+02	0.000	0.000	0.000	3.161E+03	3.029E+01	1.562E+02	3.029E+01	1.562E+02
5.631E+01	1.089E+01	1.089E+01	-1.768E+02	0.000	0.000	0.000	3.209E+03	2.830E+01	1.460E+02	2.830E+01	1.460E+02
5.651E+01	6.787E+00	1.062E+01	-7.400E+01	0.000	0.000	0.000	3.215E+03	1.744E+01	9.099E+03	2.811E+01	1.450E+02
5.651E+01	6.787E+00	1.062E+01	-7.400E+01	0.000	0.000	0.000	3.233E+03	1.744E+01	9.099E+03	2.760E+01	1.424E+02
5.651E+01	1.051E+01	1.051E+01	-6.337E+01	0.000	0.000	0.000	3.233E+03	1.744E+01	9.099E+03	2.760E+01	1.424E+02
5.687E+01	1.003E+01	1.003E+01	-4.900E+01	0.000	0.000	0.000	3.280E+03	2.732E+01	1.409E+02	2.732E+01	1.409E+02
5.709E+01	1.003E+01	1.003E+01	-4.900E+01	0.000	0.000	0.000	3.280E+03	2.732E+01	1.409E+02	2.732E+01	1.409E+02
5.762E+01	9.712E+00	9.712E+00	-1.333E+01	0.000	0.000	0.000	3.306E+03	2.655E+01	1.344E+02	2.655E+01	1.344E+02
							3.402E+03	2.524E+01	1.302E+02	2.524E+01	1.302E+02

READING = 0054 BLOCK = 139 TIME = 222.15H NACH 6.0 PI = 705.999 TI = 2071.5



MACH	P18	P08	PDA	Q0K	Q0B	Q0R	CANALL	P18/P80	P18/P10	P08/P80	P08/P10
5.00E 01	5.437E 00	5.437E 00	4.210E 00	-3.601E 03	-1.600E 03	-1.621E 03	3.532E 03	1.413E 01	7.289E-03	1.413E 01	7.289E-03
6.00E 01	1.142E 01	1.142E 01	6.178E 00	-3.732E 03	-1.720E 03	-2.012E 03	3.740E 03	2.949E 01	1.532E-02	2.949E 01	1.532E-02
6.27E 01	1.557E 01	1.557E 01	6.178E 00	-3.847E 03	-1.795E 03	-2.082E 03	3.922E 03	4.047E 01	2.088E-02	4.047E 01	2.088E-02
6.47E 01	1.687E 01	1.687E 01	6.178E 00	-4.017E 03	-1.801E 03	-2.216E 03	4.284E 03	4.385E 01	2.262E-02	4.385E 01	2.262E-02
6.51E 01	1.707E 01	1.707E 01	6.178E 00	-4.059E 03	-1.811E 03	-2.239E 03	4.337E 03	3.635E 01	1.878E-02	4.432E 01	2.289E-02
6.51E 01	1.709E 01	1.709E 01	6.178E 00	-4.059E 03	-1.811E 03	-2.241E 03	4.342E 03	3.635E 01	1.878E-02	4.442E 01	2.291E-02
6.55E 01	1.720E 01	1.720E 01	6.178E 00	-4.071E 03	-1.818E 03	-2.253E 03	4.368E 03	3.512E 01	1.812E-02	4.469E 01	2.306E-02
6.70E 01	9.210E 00	6.730E 00	1.376E 02	-4.141E 03	-1.855E 03	-2.336E 03	4.583E 03	2.497E 01	1.289E-02	1.749E 01	9.041E-03
6.76E 01	7.130E 00	6.092E 00	2.974E 02	-4.230E 03	-1.868E 03	-2.364E 03	4.665E 03	1.853E 01	9.558E-03	2.102E 01	1.085E-02
6.80E 01	4.800E 00	6.373E 00	4.745E 02	-4.273E 03	-1.877E 03	-2.395E 03	4.760E 03	1.112E 01	8.737E-03	1.650E 01	8.543E-03
6.91E 01	3.435E 00	4.765E 00	5.947E 02	-4.313E 03	-1.896E 03	-2.427E 03	4.848E 03	8.927E 00	4.605E-03	1.230E 01	6.381E-03
6.97E 01	2.720E 00	3.995E 00	6.746E 02	-4.348E 03	-1.892E 03	-2.456E 03	4.922E 03	7.068E 00	3.646E-03	1.030E 01	5.355E-03
7.07E 01	2.018E 00	2.795E 00	7.649E 02	-4.403E 03	-1.899E 03	-2.504E 03	5.036E 03	5.243E 00	2.705E-03	7.263E 00	3.747E-03
7.11E 01	1.700E 00	2.583E 00	7.966E 02	-4.427E 03	-1.912E 03	-2.525E 03	5.088E 03	4.417E 00	2.279E-03	6.712E 00	3.463E-03
7.20E 01	1.272E 00	1.830E 00	8.829E 02	-4.486E 03	-1.910E 03	-2.579E 03	5.273E 03	3.305E 00	1.705E-03	4.755E 00	2.453E-03
7.28E 01	1.230E 00	1.660E 00	8.693E 02	-4.490E 03	-1.911E 03	-2.579E 03	5.290E 03	3.196E 00	1.649E-03	4.311E 00	2.258E-03
7.39E 01	1.241E 00	8.100E-01	9.312E 02	-4.512E 03	-1.915E 03	-2.598E 03	5.374E 03	3.224E 00	1.663E-03	2.102E 00	1.086E-03
7.39E 01	1.241E 00	8.055E-01	9.328E 02	-4.512E 03	-1.915E 03	-2.598E 03	5.375E 03	3.224E 00	1.663E-03	2.092E 00	1.086E-03
7.42E 01	1.260E 00	0.000	9.592E 02	-4.549E 03	-1.920E 03	-2.637E 03	5.426E 03	3.274E 00	1.689E-03	0.000	0.000
7.77E 01	1.595E 00	0.000	1.016E 03	-4.586E 03	-1.931E 03	-2.637E 03	5.525E 03	4.145E 00	2.138E-03	0.000	0.000
8.17E 01	1.550E 00	0.000	1.084E 03	-4.586E 03	-1.931E 03	-2.637E 03	5.630E 03	4.028E 00	2.078E-03	0.000	0.000
8.49E 01	1.240E 00	0.000	1.115E 03	-4.591E 03	-1.934E 03	-2.637E 03	5.684E 03	3.222E 00	1.662E-03	0.000	0.000
8.73E 01	1.640E 00	0.000	1.149E 03	-4.610E 03	-1.938E 03	-2.637E 03	5.707E 03	4.261E 00	2.192E-03	0.000	0.000
8.73E 01	1.641E 00	0.000	1.149E 03	-4.610E 03	-1.938E 03	-2.637E 03	5.707E 03	4.264E 00	2.200E-03	0.000	0.000

READING = 0054 BLOCK = 139 TIME = 222.150 MACH 6.0 PI = 745.999 TT = 2971.5

X	DORAG	CDRAG	CF	HC
4.040E 01	1.186E 02	1.186E 02	2.182E 03	4.302E 02
4.041E 01	1.894E 01	1.186E 02	2.527E 03	3.765E 02
4.042E 01	1.907E 01	1.379E 02	2.692E 03	4.804E 02
4.043E 01	1.807E 01	1.380E 02	2.467E 03	5.140E 02
4.044E 01	1.183E 00	1.392E 02	2.441E 03	5.251E 02
4.045E 01	1.324E 00	1.405E 02	2.449E 03	5.388E 02
4.046E 01	1.691E 01	1.575E 02	2.536E 03	5.656E 02
4.047E 01	2.468E 00	1.648E 02	2.734E 03	6.729E 02
4.048E 01	7.424E 00	1.947E 02	2.838E 03	6.527E 02
4.049E 01	9.239E 01	1.956E 02	2.834E 03	6.509E 02
4.050E 01	2.106E 01	2.167E 02	2.968E 03	5.689E 02
4.051E 01	1.491E 01	2.169E 02	2.733E 03	6.168E 02
4.052E 01	1.459E 01	2.314E 02	2.685E 03	5.671E 02
4.053E 01	1.051E 00	2.325E 02	2.696E 03	5.602E 02
4.054E 01	9.704E 00	2.422E 02	2.648E 03	5.137E 02
4.055E 01	9.530E 00	2.517E 02	2.851E 03	4.583E 02
4.056E 01	1.278E 01	2.519E 02	2.631E 03	4.923E 02
4.057E 01	6.537E 00	2.582E 02	2.591E 03	4.643E 02
4.058E 01	1.527E 01	2.735E 02	2.551E 03	4.200E 02
4.059E 01	2.004E 01	2.935E 02	2.595E 03	3.444E 02
4.060E 01	4.542E 00	2.980E 02	2.686E 03	3.177E 02
4.061E 01	6.679E 00	3.047E 02	2.676E 03	3.057E 02
4.062E 01	6.486E 00	3.112E 02	2.708E 03	2.906E 02
4.063E 01	7.220E 00	3.184E 02	2.702E 03	2.663E 02
4.064E 01	2.738E 00	3.212E 02	2.660E 03	2.459E 02
4.065E 01	3.714E 01	3.215E 02	2.829E 03	2.008E 02
4.066E 01	9.626E 01	3.225E 02	2.681E 03	2.083E 02
4.067E 01	5.742E 01	3.231E 02	3.131E 03	2.036E 02
4.068E 01	3.021E 00	3.251E 02	2.807E 03	2.204E 02
4.069E 01	1.547E 00	3.266E 02	2.785E 03	2.202E 02
4.070E 01	4.927E 00	3.316E 02	2.767E 03	2.104E 02
4.071E 01	7.242E 00	3.388E 02	2.738E 03	1.470E 02
4.072E 01	1.338E 01	3.522E 02	2.440E 03	2.677E 02
4.073E 01	8.883E 01	3.611E 02	2.915E 03	2.725E 02
4.074E 01	1.566E 01	3.767E 02	3.100E 03	2.593E 02
4.075E 01	2.264E 00	3.790E 02	3.182E 03	2.363E 02
4.076E 01	2.379E 01	3.792E 02	3.240E 03	2.435E 02
4.077E 01	1.201E 00	3.804E 02	3.237E 03	2.425E 02
4.078E 01	9.849E 00	3.903E 02	3.105E 03	1.765E 02
4.079E 01	3.591E 00	3.939E 02	3.091E 03	1.691E 02
4.080E 01	3.869E 00	3.977E 02	3.028E 03	1.348E 02
4.081E 01	3.171E 00	4.009E 02	2.984E 03	1.129E 02
4.082E 01	2.397E 00	4.033E 02	2.950E 03	9.819E 01
4.083E 01	3.235E 00	4.065E 02	2.895E 03	7.727E 01
4.084E 01	1.299E 00	4.078E 02	2.878E 03	7.008E 01
4.085E 01	4.067E 00	4.119E 02	2.829E 03	5.583E 01
4.086E 01	3.378E 01	4.122E 02	2.817E 03	3.243E 01
4.087E 01	1.463E 00	4.137E 02	2.760E 03	4.073E 01
4.088E 01	2.505E 03	4.137E 02	2.760E 03	4.066E 01
4.089E 01	8.560E 01	4.146E 02	2.745E 03	4.752E 01
4.090E 01	1.851E 00	4.164E 02	2.806E 03	5.644E 01
4.091E 01	2.090E 00	4.185E 02	2.782E 03	5.485E 01
4.092E 01	1.003E 00	4.195E 02	2.736E 03	4.612E 01
4.093E 01	4.225E 01	4.199E 02	2.766E 03	5.667E 01
4.094E 01	0.000	4.199E 02	2.766E 03	5.669E 01

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... 709. (LBF)  
 MEASURED THRUST..... 724. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1611. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1656. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.2835  
 MEASURED THRUST COEFFICIENT..... 0.2915

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 5665. (LBF)  
 NET THRUST..... 802. (LBF)  
 SPECIFIC IMPULSE..... 2017. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.3550

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 118.6 (LBF)  
 INLET MOMENTUM CHANGE..... -726.7 (LBF)  
 COMBUSTOR FRICTION DRAG..... 260.4 (LBF)  
 COMBUSTOR STRUT DRAG..... -6.18 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 329 (LBF)  
 NOZZLE FRICTION DRAG..... 40.94 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1102 (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1143 (LBF)  
 EXTERNAL FRICTION DRAG..... 61.21 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -973 (LBF)  
 TOTAL EXTERNAL DRAG..... -1034 (LBF)  
 TOTAL STRUT DRAG..... -1333 (LBF)  
 CAVITY FORCE..... -1663 (LBF)  
 CALCULATED LOAD CELL FORCE..... -1643 (LBF)  
 MEASURED LOAD CELL FORCE..... 0.0  
 FUEL VACUUM SPECIFIC IMPULSE 0.0, -165.4, -122.6.

STATIONS

NOMINAL COMB. LEADING EDGE..... 34.894 (IN)  
 SPIKE TRANSLATION..... 0.3667 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COMB. LEADING EDGE..... 35.251 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.591 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.343 (IN)  
 STRUT LEADING EDGE..... 56.507 (IN)  
 STRUT TRAILING EDGE..... 65.107 (IN)  
 COMBUSTOR EXIT..... 65.107 (IN)

INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9830  
 ADDITIVE DRAG COEFFICIENT..... 0.0004  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1628  
 DELTA PT2..... 0.1176 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3985  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1651  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.6970  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9057  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9383  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8879  
 ENTHALPY AT P0 = SUPERSONIC..... -6.57 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 29.42 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO..... 0.0164  
 EQUIVALENCE RATIO..... 0.490  
 COMBUSTOR EFFICIENCY..... 0.807  
 TOTAL PRESSURE RATIO..... 0.1227  
 COMBUSTOR EFFECTIVENESS..... 0.7162  
 INJECTOR DISCHARGE COEFFICIENTS 0.8445, 0.6727, 0.7591, 0.7199

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9719  
 NOZZLE COEFFICIENT = C1..... 0.4904  
 PROCESS EFFICIENCY..... 0.9479  
 KINETIC ENERGY EFFICIENCY..... 0.9383

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.352	B
1C	40.300	C
2A	48.827	D
2C	46.250	E
3A	50.117	
3B	56.302	
4	44.852	

Reading 54

$t = 235.66 \text{ sec.}$

READING = 0054 BLOCK = 154 TIME = 235.658 MACH 0.0 PT = 746.499 TT = 2921.5  
 RAMJET PERFORMANCE

SUMMARY REPORT

P	T	M	S	GAMPA	MOL-T	SONV	MACH	VEL	9	W/A	M	A/VAC	MUPTH	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	746.499	2981	663.8( 789)	1.2932	28.972	2572											
0.000	0.387	403	32.1( 97)	1.3189	28.971	980	5.997	5901	1.825	0.10604	26.687	0.9826	4992	9.724	187.1		
SPIKE TIP NS	2	0	4														
0.000	18.037	2981	663.8( 789)	1.2931	28.971	2572											
0.000	16.306	2914	643.4( 769)	1.2953	28.971	2545	0.347	1011	2.081	0.10604	26.687	0.9826	4942	1.666	185.2		
WIND TUNNEL	3	0	0														
0.000	746.499	2981	663.8( 789)	1.2932	28.972	2572											
0.000	0.380	401	32.6( 96)	1.3188	28.971	981	6.014	5903	1.825	0.10474	26.361	0.9826	4932	9.608	187.1		
SPIKE TIP NS	4	0	0														
0.000	18.037	2981	663.8( 789)	1.2931	28.971	2572											
0.000	16.354	2916	643.9( 770)	1.2952	28.971	2546	0.391	996	2.081	0.10474	26.361	0.9826	4932	1.621	187.1		
INLET THROAT	5	0	3														
0.000	297.672	2923	646.1( 772)	1.2951	28.972	2549											
0.000	15.526	1420	221.0( 350)	1.3524	28.971	1816	2.540	4612	1.862	0.94515	26.687	0.1102	4264	67.741	159.6		
INLET UPNRK	6	0	3														
0.000	297.672	2923	646.1( 772)	1.2951	28.972	2549											
0.000	13.341	1365	206.5( 335)	1.3556	28.971	1782	2.632	4690	1.862	0.85921	26.687	0.1213	4305	62.624	161.3		
INLET DNNRK	7	0	4														
0.000	123.277	2923	646.1( 772)	1.2951	28.972	2549											
0.000	105.980	2824	616.2( 743)	1.2983	28.972	2508	0.487	1221	1.943	0.85921	26.687	0.1213	4305	16.304	161.3		
COMBUSTOR	8	0	21														
0.000	242.207	2888	651.4( 800)	1.2976	27.517	2602											
0.000	13.931	1433	220.2( 371)	1.3531	27.517	1872	2.462	4695	1.977	0.94493	26.747	0.1103	4263	66.505	159.1	0.12	0.07
COMBUSTOR	9	0	21														
0.000	169.117	2816	656.7( 813)	1.3017	26.249	2635											
0.000	20.801	1690	305.4( 464)	1.3417	26.249	2073	2.023	4193	2.070	0.95296	26.900	0.1102	4043	62.092	152.1	0.24	0.04
COMBUSTOR	10	0	21														
0.000	176.261	2770	656.7( 799)	1.3038	26.201	2618											
0.000	20.874	1643	306.1( 451)	1.3444	26.201	2047	2.046	4198	2.062	0.95319	26.900	0.1102	4041	62.034	152.1	0.24	0.01
COMBUSTOR	11	0	21														
0.000	174.205	2762	656.3( 797)	1.3042	26.194	2615											
0.000	21.350	1652	311.0( 453)	1.3440	26.194	2053	2.025	4157	2.062	0.95358	26.900	0.1101	4078	61.597	151.0	0.24	0.00
COMBUSTOR	12	0	21														
0.000	170.735	2760	655.9( 796)	1.3043	26.193	2614											
0.000	22.430	1680	319.7( 462)	1.3427	26.193	2069	1.982	4102	2.063	0.95396	26.900	0.1101	4062	60.808	151.0	0.24	0.00
COMBUSTOR	13	0	21														
0.000	143.002	2740	649.4( 789)	1.3050	26.193	2605											
0.000	26.096	1812	359.1( 501)	1.3371	26.192	2140	1.778	3811	2.074	0.94504	26.900	0.1111	3929	55.971	146.1	0.24	0.00
COMBUSTOR	14	0	21														
0.000	105.320	3115	635.0( 904)	1.2868	26.639	2735											
0.000	45.641	2574	458.0( 731)	1.3050	26.640	2508	1.169	2976	2.120	0.90974	26.900	0.1154	3838	42.077	142.7	0.24	0.33
COMBUSTOR	15	0	2														
0.000	104.613	3113	633.5( 903)	1.2869	26.641	2734											
0.000	46.567	2588	461.8( 735)	1.3045	26.642	2510	1.168	2931	2.120	0.90930	26.900	0.1155	3828	41.420	142.3	0.24	0.33
COMBUSTOR	16	0	2														
0.000	102.465	3091	628.6( 896)	1.2877	26.633	2726											
0.000	49.280	2615	473.1( 744)	1.3037	26.634	2523	1.166	2790	2.127	0.90595	26.900	0.1159	3796	39.276	141.1	0.24	0.32
COMBUSTOR	17	0	2														
0.000	102.313	3084	628.0( 894)	1.2880	26.627	2723											
0.000	49.134	2608	472.5( 742)	1.3040	26.628	2520	1.167	2789	2.127	0.90546	26.900	0.1160	3792	39.251	141.0	0.24	0.32
COMBUSTOR	18	0	2														
0.000	95.386	2720	633.5( 847)	1.3064	24.175	2703											
0.000	45.602	2280	462.1( 698)	1.3212	24.175	2489	1.166	2752	2.245	0.86094	27.107	0.1229	3750	36.817	138.5	0.47	0.08

READING # 0054 BLOCK # 154 TIME # 235.658 MACH 6.0 PT # 746.499 II # 2981.5

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	8	W/A	N	A/AC	MURTH	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	95.354	2720	633.4	( 848)	1.3064	24.176	2703										
46.260	45.577	2281	482.0	( 608)	1.3212	24.176	2489	1.106	2752	2.245	0.86054	27.107	0.1230	3755	36.809	138.5	0.47 0.08
COMBUSTOR	0	20	13	4													
47.310	90.757	2846	622.0	( 889)	1.3002	24.327	2750										
47.310	42.913	2386	462.3	( 731)	1.3157	24.327	2533	1.116	2827	2.260	0.80046	27.107	0.1322	3835	35.167	141.5	0.47 0.15
COMBUSTOR	0	21	14	3													
47.383	90.500	2856	621.2	( 892)	1.2997	24.339	2754										
47.383	42.806	2395	461.1	( 734)	1.3152	24.339	2537	1.116	2831	2.261	0.79694	27.107	0.1328	3841	35.058	141.7	0.47 0.15
COMBUSTOR	0	22	15	4													
48.110	87.277	2974	613.8	( 930)	1.2940	24.475	2796										
48.110	38.778	2463	435.2	( 755)	1.3112	24.475	2561	1.167	2990	2.273	0.74557	27.107	0.1419	3929	34.639	144.9	0.47 0.21
COMBUSTOR	0	23	16	6													
48.823	82.359	2722	623.5	( 927)	1.3073	22.102	2829										
48.823	33.563	2194	425.7	( 731)	1.3255	22.102	2558	1.230	3146	2.426	0.68833	27.362	0.1552	4009	33.650	146.5	0.76 0.11
COMBUSTOR	0	24	17	8													
48.833	82.308	2724	623.4	( 927)	1.3073	22.104	2830										
48.833	33.493	2194	425.3	( 731)	1.3255	22.104	2558	1.231	3149	2.426	0.68743	27.362	0.1554	4011	33.639	146.6	0.76 0.11
COMBUSTOR	0	25	18	4													
49.363	79.908	2796	619.0	( 923)	1.3038	22.177	2859										
49.363	29.808	2209	398.7	( 735)	1.3239	22.177	2561	1.297	3320	2.436	0.64291	27.362	0.1662	4092	33.173	149.6	0.76 0.13
COMBUSTOR	0	26	19	5													
50.773	70.302	3165	608.4	(1087)	1.2860	22.534	2997										
50.773	29.087	2587	385.1	( 868)	1.3058	22.535	2730	1.224	3342	2.440	0.54794	27.362	0.1950	4295	28.461	157.0	0.76 0.25
COMBUSTOR	0	27	20	4													
52.873	65.200	3373	595.1	(1162)	1.2751	22.741	3065										
52.873	20.400	2600	293.4	( 868)	1.3023	22.765	2719	1.429	3845	2.501	0.44910	27.362	0.2379	4547	27.116	166.2	0.76 0.32
COMBUSTOR	0	28	21	4													
53.373	63.714	3427	592.3	(1142)	1.2722	22.820	3082										
53.373	19.408	2630	280.1	( 878)	1.3004	22.824	2730	1.448	3952	2.506	0.43074	27.362	0.2480	4594	26.456	167.9	0.76 0.34
COMBUSTOR	0	29	22	4													
54.123	62.406	3469	588.3	(1197)	1.2698	22.870	3095										
54.123	17.591	2619	255.0	( 873)	1.3001	22.875	2720	1.501	4084	2.511	0.40604	27.362	0.2631	4658	25.768	170.2	0.76 0.36
COMBUSTOR	0	30	23	3													
56.883	61.800	3480	584.5	(1201)	1.2691	22.889	3097										
56.883	15.750	2568	227.6	( 854)	1.3016	22.895	2698	1.569	4226	2.512	0.38396	27.362	0.2782	4716	25.214	172.4	0.76 0.36
COMBUSTOR	0	31	24	4													
55.760	59.709	3545	580.3	(1225)	1.2654	22.963	3116										
55.760	14.703	2603	209.7	( 865)	1.2994	22.971	2706	1.592	4307	2.518	0.36165	27.362	0.2954	4775	24.205	174.5	0.76 0.39
COMBUSTOR	0	32	25	5													
56.308	46.697	3980	578.0	(1367)	1.2378	23.412	3235										
56.308	14.050	3118	217.4	(1051)	1.2744	23.443	2903	1.463	4248	2.564	0.29039	27.362	0.3679	4936	19.171	180.4	0.76 0.53
COMBUSTOR	0	33	26	5													
56.363	53.290	3646	577.6	(1262)	1.2593	23.070	3146										
56.363	10.836	2574	154.0	( 853)	1.2989	23.081	2684	1.716	4605	2.534	0.28952	27.362	0.3690	4940	20.718	180.5	0.76 0.42
COMBUSTOR	0	34	27	3													
56.503	53.049	3656	577.2	(1266)	1.2587	23.081	3148										
56.503	10.752	2580	151.6	( 855)	1.2986	23.092	2686	1.718	4615	2.535	0.28744	27.362	0.3717	4948	20.614	180.6	0.76 0.42
COMBUSTOR	0	35	28	6													
56.583	47.516	3971	577.0	(1383)	1.2385	23.405	3232										
56.583	13.722	3082	206.4	(1037)	1.2759	23.435	2888	1.491	4306	2.562	0.29076	27.362	0.3674	4953	19.456	181.0	0.76 0.53
COMBUSTOR	0	36	29	3													
56.863	48.052	3964	575.8	(1380)	1.2390	23.400	3230										
56.863	13.387	3051	196.6	(1025)	1.2772	23.430	2876	1.515	4356	2.561	0.28980	27.362	0.3686	4969	19.619	181.6	0.76 0.53
COMBUSTOR	0	37	30	3													
57.089	48.935	3933	574.9	(1369)	1.2412	23.370	3223										
57.089	12.909	2987	184.5	(1002)	1.2600	23.398	2850	1.551	4420	2.557	0.28925	27.362	0.3693	4980	19.868	182.0	0.76 0.52

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	M/A	M	A/PAC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4													
57.813	51.629	3019	572.2(1326)	1.2486	23.259	3193											
57.813	11.375	2771	148.8( 922)	1.2494	23.274	2762	1.606	4603	2.546	0.28466	27.362	0.3753	5008	20.362	183.0	0.76	0.48
COMBUSTOR	0	39	32	6													
58.833	93.804	3051	569.1(11043)	1.2903	22.521	2948											
58.833	5.737	1552	18.2( 497)	1.3468	22.522	2148	2.444	5250	2.441	0.28285	27.362	0.3777	5020	23.079	183.5	0.76	0.25
COMBUSTOR	0	40	33	6													
60.843	45.887	4262	563.5(1492)	1.2170	23.752	3295											
60.843	16.200	3505	226.1(1192)	1.2530	23.816	3028	1.357	4109	2.577	0.29270	27.362	0.3650	5009	18.692	183.1	0.76	0.64
COMBUSTOR	0	41	34	3													
62.263	47.134	4241	559.4(1483)	1.2188	23.739	3290											
62.263	16.800	3677	221.2(1182)	1.2546	23.799	3019	1.363	4114	2.573	0.30063	27.362	0.3553	5000	19.219	182.7	0.76	0.64
COMBUSTOR	0	42	35	4													
64.727	42.236	4470	551.2(1569)	1.1995	24.015	3332											
64.727	19.780	3928	288.2(1352)	1.2267	24.107	3152	1.151	3628	2.590	0.28496	27.362	0.3749	4984	16.065	182.2	0.76	0.74
COMBUSTOR	0	43	36	4													
65.103	38.892	4527	549.8(1590)	1.1937	24.083	3340											
65.103	20.359	4071	320.6(1407)	1.2165	24.179	3191	1.061	3386	2.598	0.26492	27.362	0.4032	4982	13.940	182.1	0.76	0.76
COMBUSTOR	0	44	37	21													
65.103	38.892	4663	631.0(1646)	1.1849	24.025	3381											
65.103	28.807	4357	517.9(1562)	1.1941	24.090	3314	0.718	2379	2.616	0.26492	27.362	0.4032	4998	9.794	182.7	0.76	0.76
NOZZLE	AE	45	38	5													
87.339	38.892	4527	549.8(1544)	1.1937	24.083	3340											
87.339	1.135	2244	415.0( 713)	1.2968	24.249	2442	2.845	6948	2.598	0.05515	27.362	1.9371	6472	5.955	236.5	0.76	0.76
NOZZLE	P0	46	39	5													
87.339	38.892	4527	549.8(1544)	1.1937	24.083	3340											
87.339	0.187	1742	590.1( 538)	1.3185	24.249	2170	3.481	7552	2.598	0.02631	27.362	4.0610	6825	3.088	249.4	0.76	0.76
NOZZLE	AE	47	40	5													
87.339	38.892	4663	631.0(1646)	1.1849	24.025	3381											
87.339	1.184	2379	566.2( 762)	1.2916	24.249	2510	2.814	7064	2.616	0.05515	27.362	1.9371	6595	6.034	241.0	0.76	0.76
NOZZLE	P0	48	41	5													
87.339	38.892	4663	631.0(1646)	1.1849	24.025	3381											
87.339	0.187	1834	558.5( 570)	1.3141	24.249	2223	3.471	7715	2.616	0.02552	27.362	4.1868	6976	3.059	255.0	0.76	0.76
PCTIVE	COMBUSTOR	68	61	0													
65.103	297.672	5164	549.8(1833)	1.1783	24.814	3492											
65.103	0.187	1335	1032.5( 305)	1.3331	25.136	1876	4.742	8898	2.442	0.04190	27.362	2.5496	7820	5.794	285.8	0.76	1.00
PCTIVE	NOZZLE	69	62	0													
87.339	26.378	4468	526.2(1547)	1.1921	24.080	3316											
87.339	1.363	2518	515.5( 812)	1.2865	24.248	2577	2.518	6490	2.625	0.05515	27.362	1.9371	6196	5.562	226.4	0.76	0.76

READING = 0054 BLOCK = 154 TIME = 235.650 MACH 6.0 PI = 746.499 TI = 2081.5										PAGE 8	
XABB	P=IB	P=OB	PDA	GOA	U=IR	G=OB	CWALL	P=IB/P80	P=IB/P10	P=OB/P80	P=OB/P10
6.981E-01	9.900E-01	0.000	-4.239E-01	0.000	0.000	0.000	2.470E-02	2.561E-00	1.326E-03	0.000	0.000
1.836E-01	9.900E-01	0.000	-3.299E-01	0.000	0.000	0.000	1.635E-02	2.561E-00	1.326E-03	0.000	0.000
3.076E-01	2.140E-00	0.000	-1.599E-01	0.000	0.000	0.000	5.053E-02	5.556E-00	2.867E-03	0.000	0.000
3.508E-01	3.855E-00	0.000	-3.542E-02	0.000	0.000	0.000	6.875E-02	9.976E-00	5.166E-03	0.000	0.000
3.524E-01	3.915E-00	5.790E-00	-4.236E-02	0.000	0.000	0.000	6.875E-02	1.012E-01	5.243E-03	1.485E-01	7.690E-03
3.525E-01	3.915E-00	5.790E-00	-4.237E-02	0.000	0.000	0.000	6.875E-02	1.013E-01	5.246E-03	1.485E-01	7.640E-03
3.555E-01	4.025E-00	3.835E-00	-4.302E-02	0.000	0.000	0.000	7.182E-02	1.011E-01	5.292E-03	9.920E-00	5.137E-03
3.591E-01	3.945E-00	1.600E-00	-4.480E-02	0.000	0.000	0.000	7.551E-02	1.021E-01	5.267E-03	1.139E-00	2.143E-03
3.640E-01	4.191E-00	2.895E-00	-4.726E-02	0.000	0.000	0.000	7.702E-02	1.021E-01	5.244E-03	6.947E-00	3.597E-03
3.701E-01	4.322E-00	9.685E-00	-4.878E-02	0.000	0.000	0.000	8.137E-02	1.044E-01	5.614E-03	1.495E-01	7.743E-03
3.705E-01	4.315E-00	1.000E-00	-4.890E-02	0.000	0.000	0.000	8.699E-02	1.118E-01	5.787E-03	2.505E-01	1.297E-02
3.737E-01	4.279E-00	8.137E-00	-4.976E-02	0.000	0.000	0.000	9.087E-02	1.107E-01	5.732E-03	2.105E-01	1.090E-02
3.790E-01	4.219E-00	1.152E-00	-5.142E-02	0.000	0.000	0.000	9.666E-02	1.101E-01	5.552E-03	2.962E-01	1.534E-02
3.803E-01	4.203E-00	1.145E-01	-5.158E-02	0.000	0.000	0.000	9.803E-02	1.088E-01	5.533E-03	2.961E-01	1.533E-02
3.839E-01	3.979E-00	1.432E-01	-5.230E-02	0.000	0.000	0.000	1.041E-02	1.546E-01	8.005E-03	3.956E-01	1.986E-02
3.875E-01	7.721E-00	1.482E-01	-5.305E-02	0.000	0.000	0.000	1.061E-03	1.977E-01	1.034E-02	3.816E-01	1.986E-02
3.886E-01	8.271E-00	1.590E-01	-5.309E-02	0.000	0.000	0.000	1.074E-03	2.150E-01	1.108E-02	4.113E-01	2.130E-02
3.901E-01	8.990E-00	1.611E-01	-5.310E-02	0.000	0.000	0.000	1.091E-03	2.326E-01	1.204E-02	4.168E-01	2.150E-02
3.937E-01	1.547E-01	1.684E-01	-5.388E-02	0.000	0.000	0.000	1.135E-03	3.968E-01	2.069E-02	4.304E-01	2.229E-02
3.950E-01	1.771E-01	1.528E-01	-5.446E-02	0.000	0.000	0.000	1.149E-03	4.592E-01	2.733E-02	4.014E-01	2.079E-02
3.986E-01	1.825E-01	1.232E-01	-5.432E-02	0.000	0.000	0.000	1.190E-03	4.730E-01	2.980E-02	3.188E-01	1.532E-02
4.002E-01	1.855E-01	9.837E-00	-5.720E-02	0.000	0.000	0.000	1.208E-03	4.730E-01	2.799E-02	2.553E-01	1.322E-02
4.036E-01	2.380E-01	3.375E-00	-6.087E-02	0.000	0.000	0.000	1.240E-03	6.153E-01	3.188E-02	8.731E-00	4.521E-03
4.040E-01	2.434E-01	3.377E-00	-6.133E-02	0.000	0.000	0.000	1.253E-03	6.246E-01	3.260E-02	8.737E-00	4.524E-03
4.041E-01	2.448E-01	3.378E-00	-6.145E-02	0.000	0.000	0.000	1.254E-03	6.334E-01	3.280E-02	8.738E-00	4.525E-03
4.135E-01	3.811E-01	3.436E-00	-7.854E-02	0.000	0.000	0.000	1.354E-03	9.873E-01	5.113E-02	8.888E-00	4.603E-03
4.136E-01	3.812E-01	3.437E-00	-7.855E-02	0.000	0.000	0.000	1.355E-03	9.911E-01	5.132E-02	8.889E-00	4.604E-03
4.142E-01	3.925E-01	3.481E-00	-7.791E-02	0.000	0.000	0.000	1.375E-03	1.016E-02	5.259E-02	8.900E-00	4.609E-03
4.150E-01	4.035E-01	4.472E-00	-7.935E-02	0.000	0.000	0.000	1.383E-03	1.045E-02	5.101E-02	1.157E-01	5.991E-03
4.246E-01	3.941E-01	1.728E-01	-9.093E-02	0.000	0.000	0.000	1.445E-02	9.031E-01	4.677E-02	4.470E-01	2.315E-02
4.411E-01	5.328E-01	3.973E-01	-9.744E-02	0.000	0.000	0.000	1.701E-03	1.334E-02	6.906E-02	1.028E-02	5.322E-02
4.480E-01	5.803E-01	4.051E-01	-1.007E-03	0.000	0.000	0.000	1.722E-03	1.376E-02	7.127E-02	1.033E-02	5.349E-02
4.486E-01	5.769E-01	4.058E-01	-1.010E-03	0.000	0.000	0.000	1.782E-03	1.492E-02	7.288E-02	1.040E-02	5.427E-02
4.625E-01	4.647E-01	4.058E-01	-9.935E-02	0.000	0.000	0.000	1.789E-03	1.492E-02	7.288E-02	1.050E-02	5.436E-02
4.626E-01	4.648E-01	4.059E-01	-9.936E-02	0.000	0.000	0.000	1.960E-03	1.287E-02	6.560E-02	1.092E-02	5.657E-02
4.731E-01	4.234E-01	4.340E-01	-8.925E-02	0.000	0.000	0.000	2.091E-03	1.035E-02	6.552E-02	1.093E-02	5.659E-02
4.738E-01	4.202E-01	4.357E-01	-8.925E-02	0.000	0.000	0.000	2.100E-03	1.037E-02	6.531E-02	1.125E-02	5.626E-02
4.811E-01	3.905E-01	3.852E-01	-7.958E-02	0.000	0.000	0.000	2.191E-03	1.010E-02	5.229E-02	9.964E-01	5.160E-02
4.802E-01	3.956E-01	3.856E-01	-7.740E-02	0.000	0.000	0.000	2.208E-03	8.682E-01	4.996E-02	8.682E-01	4.496E-02
4.883E-01	3.342E-01	3.399E-01	-6.723E-02	0.000	0.000	0.000	2.281E-03	8.682E-01	4.987E-02	8.682E-01	4.496E-02
4.936E-01	2.981E-01	2.981E-01	-5.844E-02	0.000	0.000	0.000	2.349E-03	7.711E-01	3.943E-02	7.711E-01	3.993E-02
5.077E-01	2.902E-01	2.902E-01	-3.671E-02	0.000	0.000	0.000	2.522E-03	7.555E-01	3.897E-02	7.525E-01	3.897E-02
5.287E-01	2.040E-01	2.040E-01	-9.469E-01	0.000	0.000	0.000	2.792E-03	5.277E-01	2.733E-02	5.277E-01	2.733E-02
5.312E-01	1.941E-01	1.941E-01	-4.295E-01	0.000	0.000	0.000	2.855E-03	5.031E-01	2.600E-02	5.021E-01	2.600E-02
5.412E-01	1.759E-01	1.759E-01	-2.864E-01	0.000	0.000	0.000	2.951E-03	4.531E-01	2.356E-02	4.531E-01	2.356E-02
5.488E-01	1.575E-01	1.575E-01	-9.326E-01	0.000	0.000	0.000	3.049E-03	4.074E-01	2.110E-02	4.074E-01	2.110E-02
5.576E-01	1.470E-01	1.470E-01	-1.603E-02	0.000	0.000	0.000	3.161E-03	3.804E-01	1.970E-02	3.804E-01	1.970E-02
5.631E-01	1.405E-01	1.405E-01	-3.247E-02	0.000	0.000	0.000	3.205E-03	3.634E-01	1.882E-02	3.634E-01	1.882E-02
5.636E-01	1.398E-01	1.398E-01	-3.267E-02	0.000	0.000	0.000	3.210E-03	3.634E-01	1.882E-02	3.634E-01	1.882E-02
5.650E-01	1.382E-01	1.382E-01	-3.378E-02	0.000	0.000	0.000	3.233E-03	3.999E-01	1.030E-02	3.974E-01	1.851E-02
5.658E-01	1.372E-01	1.372E-01	-3.433E-02	0.000	0.000	0.000	3.240E-03	3.508E-01	1.938E-02	3.508E-01	1.838E-02
5.686E-01	1.339E-01	1.339E-01	-3.610E-02	0.000	0.000	0.000	3.240E-03	3.483E-01	1.793E-02	3.483E-01	1.793E-02
5.709E-01	1.291E-01	1.291E-01	-3.734E-02	0.000	0.000	0.000	3.302E-03	3.339E-01	1.729E-02	3.339E-01	1.729E-02
5.741E-01	1.137E-01	1.137E-01	-4.057E-02	0.000	0.000	0.000	3.402E-03	2.993E-01	1.524E-02	2.993E-01	1.524E-02



XAB8	P=18	P=08	PDA	GOX	W=18	W=08	CANALL	P=18/P80	P=18/P10	P=08/P80	P=08/P10
5.883E 01	5.737E 00	5.737E 00	4.265E 02	-3.945E 03	-1.808E 03	-2.137E 03	3.532E 03	1.484E 01	7.666E-03	1.484E 01	7.666E-03
6.090E 01	1.620E 01	1.620E 01	4.291E 02	-4.047E 03	-1.852E 03	-2.245E 03	3.790E 03	4.191E 01	2.170E-02	4.191E 01	2.170E-02
6.226E 01	1.650E 01	1.650E 01	4.291E 02	-4.211E 03	-1.881E 03	-2.329E 03	3.972E 03	4.268E 01	2.210E-02	4.268E 01	2.210E-02
6.473E 01	1.978E 01	1.978E 01	4.291E 02	-4.435E 03	-1.952E 03	-2.441E 03	4.289E 03	5.117E 01	2.650E-02	5.117E 01	2.650E-02
6.516E 01	2.044E 01	2.044E 01	4.291E 02	-4.475E 03	-1.965E 03	-2.500E 03	4.337E 03	5.287E 01	2.738E-02	5.287E 01	2.738E-02
6.518E 01	2.043E 01	2.043E 01	4.291E 02	-4.479E 03	-1.967E 03	-2.512E 03	4.342E 03	5.287E 01	2.738E-02	5.287E 01	2.738E-02
6.530E 01	2.060E 01	2.060E 01	4.291E 02	-4.499E 03	-1.974E 03	-2.526E 03	4.368E 03	5.026E 01	2.603E-02	5.329E 01	2.760E-02
6.700E 01	1.105E 01	9.400E 00	5.970E 02	-4.645E 03	-2.022E 03	-2.623E 03	4.583E 03	2.958E 01	1.480E-02	2.432E 01	1.259E-02
6.767E 01	7.950E 00	9.172E 00	7.672E 02	-4.692E 03	-2.036E 03	-2.656E 03	4.655E 03	2.939E 01	1.066E-02	2.373E 01	1.229E-02
6.842E 01	4.410E 00	6.946E 00	9.817E 02	-4.744E 03	-2.050E 03	-2.690E 03	4.700E 03	1.141E 01	9.908E-03	1.797E 01	9.305E-03
6.918E 01	3.501E 00	4.865E 00	1.107E 03	-4.794E 03	-2.061E 03	-2.733E 03	4.848E 03	9.955E 00	4.689E-03	1.259E 01	6.517E-03
6.972E 01	2.730E 00	4.046E 00	1.188E 03	-4.834E 03	-2.068E 03	-2.766E 03	4.928E 03	7.062E 00	3.657E-03	1.047E 01	5.420E-03
7.072E 01	2.035E 00	2.770E 00	1.279E 03	-4.893E 03	-2.077E 03	-2.817E 03	5.036E 03	5.263E 00	2.726E-03	7.166E 00	3.711E-03
7.115E 01	1.720E 00	2.364E 00	1.311E 03	-4.917E 03	-2.080E 03	-2.837E 03	5.088E 03	4.449E 00	2.304E-03	6.632E 00	3.434E-03
7.265E 01	1.287E 00	1.830E 00	1.397E 03	-4.979E 03	-2.089E 03	-2.892E 03	5.233E 03	3.330E 00	1.725E-03	4.734E 00	2.451E-03
7.283E 01	1.255E 00	1.802E 00	1.404E 03	-4.984E 03	-2.090E 03	-2.894E 03	5.250E 03	3.321E 00	1.668E-03	4.299E 00	2.236E-03
7.358E 01	1.238E 00	1.800E-01	1.446E 03	-5.010E 03	-2.092E 03	-2.914E 03	5.374E 03	3.202E 00	1.658E-03	2.121E 00	1.098E-03
7.358E 01	1.238E 00	1.800E-01	1.447E 03	-5.010E 03	-2.094E 03	-2.916E 03	5.375E 03	3.202E 00	1.658E-03	2.110E 00	1.092E-03
7.491E 01	1.225E 00	0.000	1.474E 03	-5.061E 03	-2.101E 03	-2.960E 03	5.426E 03	3.169E 00	1.641E-03	0.000	0.000
7.774E 01	2.165E 00	0.000	1.541E 03	-5.073E 03	-2.113E 03	-2.960E 03	5.525E 03	5.501E 00	2.900E-03	0.000	0.000
8.168E 01	1.572E 00	0.000	1.421E 03	-5.087E 03	-2.126E 03	-2.960E 03	5.630E 03	4.661E 00	2.103E-03	0.000	0.000
8.447E 01	1.209E 00	0.000	1.652E 03	-5.099E 03	-2.138E 03	-2.960E 03	5.684E 03	3.117E 00	1.614E-03	0.000	0.000
8.733E 01	1.643E 00	0.000	1.687E 03	-5.119E 03	-2.159E 03	-2.960E 03	5.707E 03	4.307E 00	2.230E-03	0.000	0.000
8.733E 01	1.644E 00	0.000	1.687E 03	-5.119E 03	-2.159E 03	-2.960E 03	5.707E 03	4.310E 00	2.232E-03	0.000	0.000

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0054 BLUCK = 154 TIME = 235.658 NACH 6.0 PT = 746.499 TT = 2981.5

X	DDHQ	CORAG	CF	HC
4.040E 01	1.179E 02	1.179E 02	2.102E+03	4.304E+02
4.041E 01	1.894E-01	1.181E 02	2.527E+03	3.823E+02
8.135E 01	1.891E 01	1.370E 02	2.694E+03	4.936E+02
4.136E 01	1.878E+01	1.372E 02	2.676E+03	5.277E+02
4.142E 01	1.178E 00	1.383E 02	2.451E+03	5.391E+02
4.150E 01	1.389E 00	1.397E 02	2.462E+03	5.551E+02
4.246E 01	1.679E 01	1.565E 02	2.548E+03	5.841E+02
4.414E 01	2.617E 01	1.827E 02	2.695E+03	7.328E+02
4.431E 01	2.376E 00	1.851E 02	2.912E+03	6.793E+02
4.480E 01	7.045E+01	1.921E 02	2.929E+03	6.803E+02
4.486E 01	8.103E-01	1.929E 02	2.926E+03	6.798E+02
4.625E 01	1.987E 01	2.128E 02	3.180E+03	6.062E+02
4.626E 01	1.380E+01	2.129E 02	2.836E+03	6.866E+02
4.731E 01	1.317E 01	2.261E 02	2.788E+03	6.604E+02
4.738E 01	9.061E-01	2.270E 02	2.867E+03	6.468E+02
4.811E 01	9.970E 00	2.360E 02	2.820E+03	6.217E+02
4.828E 01	9.080E 00	2.451E 02	3.144E+03	5.302E+02
4.835E 01	1.233E-01	2.452E 02	2.803E+03	5.963E+02
4.936E 01	6.170E 00	2.514E 02	2.733E+03	5.646E+02
5.077E 01	1.500E 01	2.664E 02	2.730E+03	5.380E+02
5.078E 01	2.037E 01	2.867E 02	2.775E+03	4.198E+02
5.237E 01	4.616E 00	2.915E 02	2.869E+03	3.909E+02
5.412E 01	7.168E 00	2.987E 02	2.841E+03	3.652E+02
5.588E 01	7.086E 00	3.058E 02	2.849E+03	3.390E+02
5.576E 01	7.907E 00	3.137E 02	2.824E+03	3.227E+02
5.631E 01	2.949E 00	3.167E 02	2.812E+03	2.924E+02
5.636E 01	4.069E-01	3.171E 02	2.981E+03	2.371E+02
5.650E 01	1.064E 00	3.181E 02	2.811E+03	2.441E+02
5.658E 01	6.204E-01	3.187E 02	3.239E+03	2.511E+02
5.686E 01	2.166E 00	3.209E 02	2.976E+03	2.682E+02
5.709E 01	1.690E 00	3.226E 02	2.960E+03	2.639E+02
5.781E 01	3.474E 00	3.281E 02	2.915E+03	2.469E+02
5.883E 01	6.164E 00	3.362E 02	2.835E+03	1.602E+02
6.082E 01	1.880E 01	3.605E 02	2.550E+03	3.460E+02
6.226E 01	9.518E 00	3.507E 02	3.078E+03	3.903E+02
6.473E 01	1.733E 01	3.778E 02	3.137E+03	3.023E+02
6.510E 01	2.244E 00	3.801E 02	3.284E+03	2.824E+02
6.514E 01	2.282E-01	3.804E 02	3.374E+03	2.865E+02
6.532E 01	1.212E 00	3.816E 02	3.369E+03	2.854E+02
6.700E 01	1.093E 01	3.921E 02	3.229E+03	2.144E+02
6.767E 01	4.003E 00	3.961E 02	3.200E+03	1.936E+02
6.844E 01	4.234E 00	4.003E 02	3.134E+03	1.494E+02
6.916E 01	3.409E 01	4.037E 02	3.087E+03	1.214E+02
6.977E 01	2.541E 00	4.063E 02	3.056E+03	1.047E+02
7.072E 01	3.06E 00	4.097E 02	3.006E+03	8.171E+03
7.115E 01	1.262E 00	4.110E 02	2.990E+03	7.510E+03
7.268E 01	4.266E 00	4.153E 02	2.943E+03	5.917E+03
7.283E 01	3.544E-01	4.157E 02	2.933E+03	5.611E+03
7.358E 01	1.733E 00	4.172E 02	2.880E+03	4.305E+03
7.359E 01	2.622E-03	4.172E 02	2.879E+03	4.248E+03
7.481E 01	8.870E-01	4.181E 02	2.897E+03	4.908E+03
7.776E 01	2.121E 00	4.202E 02	2.962E+03	7.484E+03
8.164E 01	2.411E 00	4.226E 02	2.897E+03	5.848E+03
8.407E 01	1.844E 00	4.237E 02	2.846E+03	4.761E+03
8.733E 01	4.404E-01	4.241E 02	2.879E+03	6.054E+03
8.734E 01	0.000	4.241E 02	2.879E+03	6.056E+03

## RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1201. (LBF)  
 MEASURED THRUST..... 1173. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1779. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1738. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.4820  
 MEASURED THRUST COEFFICIENT..... 0.4711  
  
 REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED  
 ST LAM THRUST..... 6313. (LBF)  
 NO THRUST..... 1318. (LBF)  
 SPECIFIC IMPULSE..... 1933. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.5292

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 117.9 (LBF)  
 INLET MOMENTUM CHANGE..... -791.2 (LBF)  
 COMBUSTOR FRICTION DRAG..... 282.2 (LBF)  
 COMBUSTOR STRUT DRAG..... -6.78 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 718. (LBF)  
 NOZZLE FRICTION DRAG..... 44.00 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1214. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1237. (LBF)  
 EXTERNAL FRICTION DRAG..... 61.47 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -577. (LBF)  
 TOTAL EXTERNAL DRAG..... -1039. (LBF)  
 TOTAL STRUT DRAG..... -6.78 (LBF)  
 CAVITY FORCE..... -1371. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1209. (LBF)  
 MEASURED LOAD CELL FORCE..... -1236. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.01 -168.2, -125.0.

## STATIONS

NOMINAL COWL LEADING EDGE..... 34.584 (IN)  
 SPIKE TRANSLATION..... 0.3627 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.247 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.987 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.334 (IN)  
 STRUT LEADING EDGE..... 56.503 (IN)  
 STRUT TRAILING EDGE..... 65.103 (IN)  
 COMBUSTOR EXIT..... 65.103 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9826  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1628  
 DELTA PT2..... 0.1177 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3968  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1681  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8973  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9097  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9373  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8868  
 ENTHALPY AT P0 = SUPERSONIC..... -6.10 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 29.05 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0353  
 EQUIVALENCE RATIO..... 0.756  
 COMBUSTOR EFFICIENCY..... 0.768  
 TOTAL PRESSURE RATIO..... 0.1307  
 COMBUSTOR EFFECTIVENESS..... 0.7203  
 INJECTION DISCHARGE COEFFICIENTS 0.8406, 0.6612, 0.7901, 0.6889

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9573  
 NOZZLE COEFFICIENT = C7..... 0.5797  
 PROCESS EFFICIENCY..... 0.9072  
 KINETIC ENERGY EFFICIENCY..... 0.8047

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.348	B
1C	44.300	
2A	48.823	D
2C	46.250	E
3A	54.113	
3B	56.298	
4	44.848	

Reading 54

$t = 253.65 \text{ sec.}$

READING = 0054 BLOCK = 174 TIME = 253.658 MACH 6.0 PT = 747.249 IT = 2990.2  
RAMJET PERFORMANCE

SUMMARY REPORT

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/VAC	MOMTH	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	747.249	2990	666.4	791	1.2930	28.972	2576										
0.000	0.388	405	-31.6	97	1.3989	28.971	986	5.992	5910	1.826	0.10618	26.719	0.9825	5006	9.752	187.4	
SPIKE TIP NS	2	0	4														
0.600	18.012	2990	666.4	791	1.2928	28.971	2576										
0.600	16.267	2922	645.7	771	1.2950	28.971	2548	0.399	1017	2.082	0.10618	26.719	0.9825	4938	1.678	184.8	
WIND TUNNEL	3	0	0														
0.000	747.249	2990	666.4	791	1.2930	28.972	2576										
0.000	0.379	402	-32.3	96	1.3988	28.971	983	6.016	5913	1.826	0.10442	26.276	0.9825	4924	9.595	187.4	
SPIKE TIP NS	4	0	0														
0.600	18.012	2990	666.4	791	1.2928	28.971	2576										
0.600	16.332	2924	646.5	772	1.2950	28.971	2549	0.391	997	2.082	0.10442	26.276	0.9825	4924	1.618	187.4	
INLET THROAT	5	0	3														
40.400	279.576	2931	648.6	774	1.2948	28.972	2552										
40.400	16.158	1963	232.4	361	1.3499	28.971	1841	2.478	4563	1.888	0.94469	26.719	0.1104	4247	66.997	158.9	
INLET UPNRSK	6	0	3														
40.400	279.576	2931	648.6	774	1.2948	28.972	2552										
40.400	13.870	1406	217.4	346	1.3532	28.971	1807	2.570	4645	1.888	0.85881	26.719	0.1215	4289	61.996	160.5	
INLET DNRSK	7	0	4														
40.400	122.395	2931	648.6	774	1.2948	28.972	2552										
40.400	104.873	2929	618.1	744	1.2981	28.972	2511	0.492	1236	1.944	0.85881	26.719	0.1215	4289	16.494	160.5	
COMBUSTOR	8	1	21														
40.410	236.701	2902	652.9	797	1.2968	27.796	2595										
40.410	13.923	1451	225.8	373	1.3518	27.796	1873	2.468	4623	1.964	0.94769	26.808	0.1104	4245	68.081	158.4	0.10 0.07
COMBUSTOR	9	2	21														
41.340	170.909	2844	656.0	805	1.3001	26.846	2617										
41.340	20.980	1709	308.6	460	1.3400	26.846	2060	2.024	4170	2.036	0.95187	26.882	0.1103	4076	61.679	151.6	0.18 0.04
COMBUSTOR	10	3	21														
41.350	175.860	2810	656.0	794	1.3017	26.809	2604										
41.350	21.056	1675	309.5	450	1.3420	26.809	2042	2.039	4164	2.030	0.95118	26.882	0.1103	4074	61.552	151.6	0.18 0.01
COMBUSTOR	11	4	21														
41.415	173.421	2803	655.7	792	1.3020	26.804	2602										
41.415	21.549	1687	314.5	454	1.3415	26.803	2049	2.017	4132	2.031	0.95157	26.882	0.1103	4061	61.100	151.1	0.18 0.00
COMBUSTOR	12	5	21														
41.500	169.385	2801	655.2	792	1.3021	26.803	2601										
41.500	22.594	1716	323.3	462	1.3402	26.803	2065	1.973	4076	2.032	0.95180	26.882	0.1103	4043	60.285	150.4	0.18 0.00
COMBUSTOR	13	6	21														
42.460	137.927	2772	645.8	783	1.3030	26.804	2588										
42.460	23.782	1810	350.8	490	1.3361	26.804	2118	1.814	3841	2.044	0.94644	26.984	0.1113	3900	56.501	144.5	0.18 0.00
COMBUSTOR	14	7	4														
44.135	114.213	2849	632.2	805	1.2987	26.933	2614										
44.135	32.095	2122	405.7	581	1.3232	26.933	2277	1.478	3366	2.065	0.91211	26.984	0.1155	3799	47.710	140.8	0.18 0.12
COMBUSTOR	15	8	2														
44.310	112.906	2850	630.6	808	1.2983	26.947	2616										
44.310	33.597	2144	408.3	588	1.3223	26.947	2287	1.458	3335	2.066	0.91122	26.984	0.1156	3792	47.230	140.5	0.18 0.13
COMBUSTOR	16	9	3														
44.800	109.513	2882	625.8	815	1.2970	26.989	2624										
44.800	35.280	2207	414.7	606	1.3196	26.989	2316	1.404	3251	2.070	0.90775	26.984	0.1161	3775	45.857	139.9	0.18 0.17
COMBUSTOR	17	10	2														
44.850	109.211	2884	625.3	815	1.2968	26.994	2625										
44.850	35.443	2212	415.2	608	1.3194	26.994	2319	1.399	3243	2.070	0.90738	26.984	0.1161	3773	45.725	139.8	0.18 0.17
COMBUSTOR	18	11	12														
46.250	97.146	2641	634.9	821	1.3100	24.110	2671										
46.250	40.039	2131	461.1	649	1.3274	24.110	2415	1.221	2949	2.234	0.86427	27.241	0.1231	3758	39.603	138.0	0.46 0.04

READING = 0054 BLOCK = 174 TIME = 253.658 MACH 6.0 PT = 747.249 TT = 2990.2

P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/C	MONTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0 19	12	2													
46.260	97.068 2642	634.8	( 822)	1.3099	24.112 2672											
46.260	40.072 2134	461.2	( 649)	1.3273	24.112 2417	1.220	2947	2.235	0.86360	27.241	0.1232	3759	39.553	138.0	0.46	0.04
COMBUSTOR	0 20	13	4													
47.310	90.958 2888	623.6	( 889)	1.3001	24.339 2750											
47.310	43.519 2395	466.1	( 734)	1.3153	24.339 2537	1.107	2807	2.259	0.80345	27.241	0.1324	3852	35.048	141.4	0.46	0.14
COMBUSTOR	0 21	14	3													
47.375	90.446 2871	622.9	( 896)	1.2990	24.363 2759											
47.375	44.212 2427	468.6	( 744)	1.3139	24.363 2551	1.089	2779	2.262	0.79813	27.241	0.1333	3862	34.471	141.8	0.46	0.15
COMBUSTOR	0 22	15	4													
48.110	86.384 3025	615.5	( 947)	1.2915	24.536 2814											
48.110	48.290 2647	482.1	( 816)	1.3043	24.536 2645	0.977	2584	2.278	0.74840	27.241	0.1421	3945	30.051	144.8	0.46	0.23
COMBUSTOR	0 23	16	6													
48.815	81.212 2749	629.8	( 946)	1.3064	21.881 2857											
48.815	38.368 2298	458.4	( 777)	1.3218	21.881 2627	1.115	2929	2.451	0.69255	27.530	0.1552	4031	31.523	146.4	0.78	0.11
COMBUSTOR	0 24	17	2													
48.825	81.151 2751	629.7	( 947)	1.3063	21.883 2858											
48.825	38.317 2300	458.0	( 777)	1.3217	21.883 2628	1.116	2931	2.452	0.69166	27.530	0.1554	4033	31.507	146.5	0.78	0.11
COMBUSTOR	0 25	18	4													
49.355	78.050 2881	625.3	( 995)	1.3001	22.006 2909											
49.355	35.600 2395	438.7	( 810)	1.3167	22.007 2669	1.145	3055	2.468	0.64686	27.530	0.1662	4129	30.715	150.0	0.78	0.15
COMBUSTOR	0 26	19	5													
50.765	70.766 3224	614.4	(1120)	1.2834	22.339 3035											
50.765	31.069 2675	388.9	( 909)	1.3023	22.341 2785	1.179	3288	2.506	0.55131	27.530	0.1950	4361	28.135	158.4	0.78	0.26
COMBUSTOR	0 27	20	4													
52.865	65.627 3429	598.5	(1195)	1.2723	22.576 3100											
52.865	21.450 2674	299.3	( 904)	1.2991	22.581 2766	1.399	3869	2.526	0.45351	27.631	0.2379	4630	27.271	167.6	0.78	0.33
COMBUSTOR	0 28	21	3													
53.365	64.621 3464	595.7	(1208)	1.2704	22.616 3110											
53.365	20.000 2671	280.8	( 902)	1.2987	22.622 2761	1.437	3969	2.529	0.43498	27.631	0.2480	4679	26.828	169.3	0.78	0.34
COMBUSTOR	0 29	22	4													
54.115	62.788 3530	591.5	(1232)	1.2666	22.690 3130											
54.115	18.466 2697	259.2	( 910)	1.2967	22.697 2768	1.473	4077	2.536	0.41002	27.631	0.2631	4746	25.980	171.8	0.78	0.37
COMBUSTOR	0 30	23	4													
54.875	61.470 3573	587.4	(1248)	1.2641	22.742 3142											
54.875	16.912 2693	235.8	( 908)	1.2962	22.750 2762	1.519	4194	2.540	0.38774	27.631	0.2782	4807	25.275	174.0	0.78	0.38
COMBUSTOR	0 31	24	4													
55.760	58.485 3690	583.0	(1292)	1.2571	22.868 3176											
55.760	16.326 2805	224.5	( 948)	1.2905	22.880 2804	1.510	4235	2.551	0.36501	27.631	0.2956	4873	24.025	176.4	0.78	0.42
COMBUSTOR	0 32	25	5													
56.300	46.208 4199	580.5	(1484)	1.2222	23.400 3302											
56.300	15.968 3425	237.4	(1175)	1.2583	23.454 3022	1.371	4143	2.598	0.29319	27.631	0.3679	5063	18.877	183.2	0.78	0.59
COMBUSTOR	0 33	26	5													
56.355	51.112 3884	580.2	(1365)	1.2446	23.071 3228											
56.355	12.522 2895	171.5	( 978)	1.2843	23.094 2829	1.598	4522	2.574	0.29236	27.631	0.3690	5067	20.547	183.4	0.78	0.48
COMBUSTOR	0 34	27	3													
56.495	50.816 3901	579.6	(1371)	1.2435	23.090 3232											
56.495	12.476 2911	169.8	( 984)	1.2835	23.114 2835	1.597	4528	2.575	0.29026	27.631	0.3717	5076	20.426	183.7	0.78	0.49
COMBUSTOR	0 35	28	5													
56.575	46.728 4210	579.2	(1408)	1.2214	23.415 3304											
56.575	15.786 3420	228.8	(1173)	1.2583	23.471 3019	1.387	4188	2.598	0.29357	27.631	0.3675	5082	19.104	183.9	0.78	0.60
COMBUSTOR	0 36	29	3													
56.855	46.990 4225	578.1	(1493)	1.2203	23.434 3307											
56.855	15.600 3423	221.5	(1174)	1.2578	23.492 3019	1.399	4224	2.598	0.29265	27.631	0.3686	5100	19.210	184.6	0.78	0.60
COMBUSTOR	0 37	30	4													
57.081	48.401 4146	577.1	(1463)	1.2264	23.352 3290											
57.081	14.473 3272	197.3	(1117)	1.2657	23.400 2966	1.470	4360	2.591	0.29205	27.631	0.3694	5113	19.786	185.1	0.78	0.57

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	5													
57.805	55.622	3809	574.1	(1336)	1.2496	23.008	3207										
57.805	10.862	2687	119.1	( 900)	1.2927	23.027	2738	1.742	4772	2.562	0.28746	27.631	0.3753	5142	21.316	186.1	0.78 0.46
COMBUSTOR	0	39	32	7													
58.825	98.208	3107	570.7	(1074)	1.2878	22.340	2984										
58.825	5.812	1573	-0.3	( 508)	1.3454	22.341	2170	2.463	5345	2.462	0.28563	27.631	0.3777	5153	23.727	186.5	0.78 0.26
COMBUSTOR	0	40	33	6													
60.835	47.117	4355	564.6	(1546)	1.2093	23.621	3333										
60.835	16.725	3615	217.8	(1245)	1.2459	23.702	3074	1.355	4165	2.602	0.29557	27.631	0.3650	5141	19.133	186.0	0.78 0.66
COMBUSTOR	0	41	34	4													
62.255	48.959	4294	559.9	(1519)	1.2150	23.555	3319										
62.255	16.419	3501	201.6	(1202)	1.2527	23.624	3038	1.394	4234	2.595	0.30358	27.631	0.3553	5131	19.977	185.7	0.78 0.64
COMBUSTOR	0	42	35	5													
64.719	43.253	4550	550.8	(1631)	1.1899	23.908	3370										
64.719	20.844	4080	288.5	(1423)	1.2151	24.022	3203	1.131	3623	2.615	0.28776	27.631	0.3749	5113	16.203	185.0	0.78 0.76
COMBUSTOR	0	43	36	4													
65.095	39.938	4630	549.3	(1646)	1.1854	23.957	3375										
65.095	20.959	4187	314.1	(1465)	1.2069	24.074	3230	1.062	3430	2.623	0.26752	27.631	0.4032	5111	14.261	185.0	0.78 0.79
COMBUSTOR	0	44	37	21													
65.095	39.938	4761	633.6	(1700)	1.1772	23.887	3415										
NOZZLE	AE	45	38	5													
87.331	39.938	4630	549.3	(1616)	1.1854	23.957	3375										
87.331	1.183	2348	-448.7	( 756)	1.2910	24.169	2497	2.830	7067	2.623	0.05569	27.631	1.9371	6656	6.116	240.9	0.78 0.79
NOZZLE	PO	46	39	5													
87.331	39.938	4630	549.3	(1616)	1.1854	23.957	3375										
87.331	0.388	1813	-638.4	( 566)	1.3134	24.169	2213	3.483	7709	2.623	0.02582	27.631	4.1778	7036	3.094	254.6	0.78 0.79
NOZZLE	AE	47	40	5													
87.331	39.938	4761	633.6	(1700)	1.1772	23.887	3415										
87.331	1.234	2489	-396.9	( 807)	1.2857	24.169	2566	2.799	7181	2.641	0.05569	27.631	1.9371	6779	6.215	245.3	0.78 0.79
NOZZLE	PO	48	41	5													
87.331	39.938	4761	633.6	(1700)	1.1772	23.887	3415										
87.331	0.388	1909	-605.0	( 600)	1.3089	24.169	2267	3.472	7873	2.641	0.02504	27.631	4.3085	7190	3.063	260.2	0.78 0.79
FICTIVE	COMBUSTOR	68	61	0													
65.095	279.576	5218	549.3	(1872)	1.1737	24.627	3516										
65.095	0.388	1400	-1068.1	( 419)	1.3280	24.999	1923	4.678	8996	2.470	0.04035	27.631	2.6734	7992	5.641	289.2	0.78 1.00
FICTIVE	NOZZLE	69	62	0													
87.331	26.881	4565	523.2	(1620)	1.1836	23.953	3349										
87.331	1.424	2633	-343.2	( 860)	1.2803	24.169	2633	2.500	6584	2.650	0.05569	27.631	1.9371	6361	5.698	230.2	0.78 0.79

**PAGE 4**

ACH 6.0

TIME = 253.65

174

**07B 0054 BLO**

## READING

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XABS	P-IB	P-OB	PDA	GOX	Q-IB	Q-OB	CAWALL	P-IB/PS0	P-IB/PT0	P-OB/PS0	P-OB/PT0
5.882E 01	5.812E 00	5.812E 00	5.646E 02	-3.985E 03	-1.750E 03	-2.235E 03	3.532E 03	1.497E 01	7.779E-03	1.497E 01	7.779E-03
6.083E 01	1.672E 01	1.672E 01	5.672E 02	-4.153E 03	-1.796E 03	-2.357E 03	3.790E 03	4.308E 01	2.238E-02	4.308E 01	2.238E-02
6.225E 01	1.642E 01	1.642E 01	5.672E 02	-4.282E 03	-1.828E 03	-2.454E 03	3.972E 03	4.229E 01	2.197E-02	4.229E 01	2.197E-02
6.472E 01	2.084E 01	2.084E 01	5.672E 02	-4.534E 03	-1.904E 03	-2.530E 03	4.289E 03	5.368E 01	2.789E-02	5.368E 01	2.789E-02
6.509E 01	2.040E 01	2.040E 01	5.672E 02	-4.577E 03	-1.918E 03	-2.659E 03	4.337E 03	5.254E 01	2.730E-02	5.254E 01	2.730E-02
6.513E 01	2.040E 01	2.040E 01	5.672E 02	-4.581E 03	-1.919E 03	-2.662E 03	4.342E 03	5.254E 01	2.730E-02	5.254E 01	2.730E-02
6.533E 01	1.939E 01	1.939E 01	5.672E 02	-4.604E 03	-1.927E 03	-2.677E 03	4.368E 03	4.994E 01	2.595E-02	4.994E 01	2.595E-02
6.699E 01	1.100E 01	1.100E 01	7.379E 02	-4.763E 03	-1.978E 03	-2.785E 03	4.583E 03	2.833E 01	1.472E-02	2.833E 01	1.472E-02
6.766E 01	8.273E 00	8.273E 00	9.277E 02	-4.816E 03	-1.994E 03	-2.821E 03	4.665E 03	2.131E 01	1.107E-02	2.397E 01	1.246E-02
6.893E 01	5.140E 00	7.050E 00	1.132E 03	-4.874E 03	-2.009E 03	-2.865E 03	4.760E 03	1.324E 01	6.879E-03	1.816E 01	9.435E-03
6.915E 01	3.871E 00	4.940E 00	1.267E 03	-4.930E 03	-2.021E 03	-2.909E 03	4.848E 03	9.969E 00	5.180E-03	1.272E 01	6.611E-03
6.976E 01	2.795E 00	4.133E 00	1.351E 03	-4.976E 03	-2.028E 03	-2.948E 03	4.922E 03	7.199E 00	3.740E-03	1.064E 01	5.530E-03
7.071E 01	2.072E 00	2.875E 00	1.444E 03	-5.043E 03	-2.037E 03	-3.006E 03	5.036E 03	5.337E 00	2.773E-03	7.405E 00	3.847E-03
7.114E 01	1.745E 00	2.655E 00	1.477E 03	-5.070E 03	-2.041E 03	-3.029E 03	5.088E 03	4.494E 00	2.335E-03	6.837E 00	3.552E-03
7.267E 01	1.312E 00	1.870E 00	1.566E 03	-5.140E 03	-2.051E 03	-3.089E 03	5.273E 03	3.380E 00	1.750E-03	4.816E 00	2.503E-03
7.282E 01	1.270E 00	1.697E 00	1.572E 03	-5.145E 03	-2.052E 03	-3.093E 03	5.290E 03	3.271E 00	1.700E-03	4.370E 00	2.271E-03
7.337E 01	1.266E 00	8.300E-01	1.615E 03	-5.174E 03	-2.057E 03	-3.117E 03	5.374E 03	3.262E 00	1.695E-03	2.138E 00	1.111E-03
7.358E 01	1.266E 00	8.254E-01	1.617E 03	-5.174E 03	-2.057E 03	-3.117E 03	5.375E 03	3.262E 00	1.695E-03	2.138E 00	1.111E-03
7.490E 01	1.260E 00	0.000	1.643E 03	-5.231E 03	-2.064E 03	-3.167E 03	5.426E 03	3.245E 00	1.686E-03	0.000	0.000
7.775E 01	2.255E 00	0.000	1.714E 03	-5.244E 03	-2.078E 03	-3.167E 03	5.525E 03	5.808E 00	3.018E-03	0.000	0.000
8.165E 01	1.605E 00	0.000	1.796E 03	-5.260E 03	-2.093E 03	-3.167E 03	5.630E 03	4.134E 00	2.148E-03	0.000	0.000
8.446E 01	1.225E 00	0.000	1.828E 03	-5.274E 03	-2.107E 03	-3.167E 03	5.684E 03	3.155E 00	1.639E-03	0.000	0.000
8.732E 01	1.590E 00	0.000	1.863E 03	-5.298E 03	-2.132E 03	-3.167E 03	5.707E 03	4.353E 00	2.262E-03	0.000	0.000
8.733E 01	1.591E 00	8.000	1.863E 03	-5.298E 03	-2.132E 03	-3.167E 03	5.707E 03	4.355E 00	2.263E-03	0.000	0.000

READING = 0054 BLOCK = 174 TIME = 253.656 MACH 6.0 PT = 747.249 TT = 2990.2

X	DURAG	CDRAG	CF	HC
4.040E 01	1.191E 02	1.191E 02	2.223E-03	4.403E-02
4.041E 01	1.882E-01	1.193E 02	2.496E-03	3.826E-02
4.134E 01	1.834E 01	1.376E 02	2.647E-03	4.968E-02
4.135E 01	1.843E-01	1.378E 02	2.484E-03	5.229E-02
4.141E 01	1.175E 00	1.390E 02	2.469E-03	5.330E-02
4.150E 01	1.527E 00	1.405E 02	2.482E-03	5.476E-02
4.246E 01	1.696E 01	1.574E 02	2.573E-03	5.388E-02
4.413E 01	2.755E 01	1.850E 02	2.645E-03	6.211E-02
4.431E 01	2.707E 00	1.877E 02	2.718E-03	6.097E-02
4.480E 01	7.576E 00	1.953E 02	2.727E-03	6.179E-02
4.485E 01	7.635E-01	1.960E 02	2.749E-03	6.143E-02
4.625E 01	2.162E 01	2.177E 02	3.143E-03	5.854E-02
4.626E 01	1.458E-01	2.178E 02	2.771E-03	6.680E-02
4.731E 01	1.342E 01	2.312E 02	2.755E-03	6.813E-02
4.737E 01	7.766E-01	2.320E 02	2.879E-03	6.534E-02
4.811E 01	8.555E 00	2.406E 02	2.903E-03	6.533E-02
4.881E 01	8.301E 00	2.489E 02	3.213E-03	5.499E-02
4.882E 01	1.199E-01	2.490E 02	2.861E-03	6.241E-02
4.935E 01	5.871E 00	2.548E 02	2.816E-03	6.050E-02
5.076E 01	1.462E 01	2.695E 02	2.782E-03	5.518E-02
5.286E 01	2.059E 01	2.901E 02	2.800E-03	4.331E-02
5.336E 01	4.901E 00	2.950E 02	2.887E-03	4.000E-02
5.411E 01	7.284E 00	3.022E 02	2.871E-03	3.787E-02
5.487E 01	7.166E 00	3.094E 02	2.872E-03	3.548E-02
5.576E 01	8.052E 00	3.175E 02	2.870E-03	3.426E-02
5.630E 01	2.939E 00	3.204E 02	2.877E-03	3.118E-02
5.635E 01	4.123E-01	3.208E 02	3.061E-03	2.560E-02
5.649E 01	1.088E 00	3.219E 02	2.914E-03	2.670E-02
5.657E 01	6.249E-01	3.225E 02	3.264E-03	2.729E-02
5.685E 01	2.164E 00	3.247E 02	3.069E-03	2.880E-02
5.708E 01	1.722E 00	3.264E 02	3.057E-03	2.774E-02
5.780E 01	5.742E 00	3.322E 02	2.977E-03	2.389E-02
5.882E 01	8.483E 00	3.406E 02	2.787E-03	1.656E-02
6.083E 01	1.475E 01	3.554E 02	2.551E-03	3.571E-02
6.225E 01	1.004E 01	3.654E 02	3.086E-03	2.937E-02
6.472E 01	1.780E 01	3.832E 02	3.139E-03	3.147E-02
6.509E 01	2.367E 00	3.856E 02	3.303E-03	2.896E-02
6.513E 01	2.449E-01	3.858E 02	3.389E-03	2.945E-02
6.535E 01	1.244E 00	3.871E 02	3.385E-03	2.935E-02
6.699E 01	1.076E 01	3.978E 02	3.242E-03	2.138E-02
6.766E 01	4.096E 00	4.019E 02	3.222E-03	1.987E-02
6.843E 01	4.393E 00	4.063E 02	3.165E-03	1.579E-02
6.915E 01	3.561E 00	4.099E 02	3.116E-03	1.268E-02
6.976E 01	2.628E 00	4.125E 02	3.081E-03	1.072E-02
7.071E 01	3.502E 00	4.160E 02	3.034E-03	8.403E-03
7.114E 01	1.403E 00	4.174E 02	3.018E-03	7.709E-03
7.267E 01	4.382E 00	4.218E 02	2.972E-03	6.046E-03
7.282E 01	3.633E-01	4.222E 02	2.962E-03	5.732E-03
7.357E 01	1.571E 00	4.237E 02	2.910E-03	4.391E-03
7.358E 01	2.684E-03	4.237E 02	2.909E-03	4.384E-03
7.490E 01	9.110E-01	4.247E 02	2.928E-03	5.043E-03
7.775E 01	2.193E 00	4.268E 02	2.992E-03	7.763E-03
8.165E 01	2.488E 00	4.293E 02	2.925E-03	5.981E-03
8.446E 01	1.069E 00	4.304E 02	2.874E-03	4.848E-03
8.732E 01	4.501E-01	4.309E 02	2.905E-03	6.159E-03
8.733E 01	0.000	4.309E 02	2.906E-03	6.161E-03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... 1352. (LBF)  
 MEASURED THRUST..... 1302. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1896. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1827. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5411  
 MEASURED THRUST COEFFICIENT..... 0.5213

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

STREAM THRUST..... 6479. (LBF)  
 NET THRUST..... 1469. (LBF)  
 SPECIFIC IMPULSE..... 2062. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.5883

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 119.1 (LBF)  
 INLET MOMENTUM CHANGE..... -762.4 (LBF)  
 COMBUSTOR FRICTION DRAG..... 266.5 (LBF)  
 COMBUSTOR STRUT DRAG..... -0.27 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 864. (LBF)  
 NOZZLE FRICTION DRAG..... 45.26 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1250. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1296. (LBF)  
 EXTERNAL FRICTION DRAG..... 61.26 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -977. (LBF)  
 TOTAL EXTERNAL DRAG..... -1039. (LBF)  
 TOTAL STRUT DRAG..... -0.27 (LBF)  
 CAVITY FORCE..... -1352. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1039. (LBF)  
 MEASURED LOAD CELL FORCE..... -1088. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE 0.0, 0.0, -170.9, -126.4,

STATIONS

NOMINAL COWL LEADING EDGE..... 34.804 (IN)  
 SPIKE TRANSLATION..... 0.3547 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.239 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.579 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.331 (IN)  
 STRUT LEADING EDGE..... 56.495 (IN)  
 STRUT TRAILING EDGE..... 65.095 (IN)  
 COMBUSTOR EXIT..... 65.095 (IN)

INLET

ANGLE OF ATTACK ..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9825  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1614  
 DELTA PT2..... 0.1192 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3741  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1638  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8926  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9050  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9338  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8860  
 ENTHALPY AT P0 - SUPERSONIC..... -3.28 (BTU/LBM)  
 ENTHALPY AT P0 - SUBSONIC..... 30.13 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO..... 0.0265  
 EQUIVALENCE RATIO..... 0.776  
 COMBUSTOR EFFICIENCY..... 0.785  
 TOTAL PRESSURE RATIO..... 0.1429  
 COMBUSTOR EFFECTIVENESS..... 0.7426  
 INJECTOR DISCHARGE COEFFICIENTS 0.8421, 0.5684, 0.7824, 0.6806

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS..... 0.9557  
 NOZZLE COEFFICIENT - CT..... 0.8766  
 PROCESS EFFICIENCY..... 0.9050  
 KINETIC ENERGY EFFICIENCY..... 0.9011

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.340	B
1C	44.300	
2A	48.815	D
2C	46.250	E
3A	54.105	
3B	56.290	
4	44.840	

Reading 54

$t = 280,66 \text{ sec.}$

READING = 0054 BLOCK = 204 TIME = 280.658 MACH 6.0 PT = 745.999 IT = 2988.6  
RAMJET PERFORMANCE

SUMMARY REPORT

WIND TUNNEL		P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	G	IVAC	PHI	ETAC
0.000	745.999	2989	1	0	5	1.2930	28.972	2575	1.2930	28.972	2575	1.2930	28.972	2575	1.2930	28.972	2575	1.2930
0.000	0.387	405	2	0	4	1.3989	28.971	986	5.993	5908	1.826	0.10599	26.684	0.9829	4998	9.732	187.3	
SPIKE TIP NS																		
0.680	17.975	2989	2	0	4	1.2929	28.971	2575	1.2929	28.971	2575	1.2929	28.971	2575	1.2929	28.971	2575	1.2929
0.600	16.233	2920	3	0	0	1.2951	28.971	2548	0.399	1017	2.082	0.10599	26.684	0.9829	4930	1.675	184.8	
WIND TUNNEL																		
0.000	745.999	2989	1	0	5	1.2930	28.972	2575	1.2930	28.972	2575	1.2930	28.972	2575	1.2930	28.972	2575	1.2930
0.000	0.378	402	2	0	4	1.3988	28.971	982	6.017	5911	1.826	0.10423	26.241	0.9829	4916	9.575	187.4	
SPIKE TIP NS																		
0.600	17.975	2989	2	0	4	1.2929	28.971	2575	1.2929	28.971	2575	1.2929	28.971	2575	1.2929	28.971	2575	1.2929
0.600	16.299	2923	3	0	0	1.2950	28.971	2549	0.391	997	2.082	0.10423	26.241	0.9829	4916	1.615	187.4	
INLET THROAT																		
40.400	270.412	2935	5	0	4	1.2947	28.972	2554	1.2947	28.972	2554	1.2947	28.972	2554	1.2947	28.972	2554	1.2947
40.400	16.459	1485	6	0	3	1.3486	28.971	1854	2.447	4538	1.890	0.94266	26.684	0.1105	4230	66.479	158.5	
INLET UPNRSK																		
40.400	270.412	2935	6	0	3	1.2947	28.972	2554	1.2947	28.972	2554	1.2947	28.972	2554	1.2947	28.972	2554	1.2947
40.400	14.119	1428	7	0	4	1.3520	28.971	1820	2.539	4622	1.890	0.85697	26.684	0.1216	4273	61.550	160.1	
INLET DNRSK																		
40.400	121.701	2935	7	0	4	1.2947	28.972	2554	1.2947	28.972	2554	1.2947	28.972	2554	1.2947	28.972	2554	1.2947
40.400	104.094	2832	8	0	1	1.2980	28.972	2512	0.495	1244	1.945	0.85697	26.684	0.1216	4273	16.562	160.1	
COMBUSTOR																		
40.410	223.905	2906	9	0	2	1.2967	27.788	2597	1.2967	27.788	2597	1.2967	27.788	2597	1.2967	27.788	2597	1.2967
40.410	12.476	1432	10	0	2	1.3528	27.787	1862	2.501	4657	1.969	0.94569	26.773	0.1105	4228	68.440	157.9	0.10 0.07
COMBUSTOR																		
41.336	165.811	2849	11	0	2	1.3001	26.651	2628	1.3001	26.651	2628	1.3001	26.651	2628	1.3001	26.651	2628	1.3001
41.336	16.480	1622	12	0	1	1.3443	26.651	2017	2.153	4342	2.050	0.95055	26.863	0.1103	4091	64.138	152.3	0.20 0.04
COMBUSTOR																		
41.346	172.754	2808	13	0	1	1.3020	26.608	2614	1.3020	26.608	2614	1.3020	26.608	2614	1.3020	26.608	2614	1.3020
41.346	16.523	1580	14	0	1	1.3469	26.608	1994	2.176	4338	2.043	0.95028	26.863	0.1104	4089	64.070	152.2	0.20 0.01
COMBUSTOR																		
41.411	171.527	2801	15	0	1	1.3024	26.602	2611	1.3024	26.602	2611	1.3024	26.602	2611	1.3024	26.602	2611	1.3024
41.411	16.804	1585	16	0	1	1.3466	26.602	1997	2.161	4317	2.043	0.95068	26.863	0.1103	4079	63.780	151.9	0.20 0.00
COMBUSTOR																		
41.500	169.260	2799	17	0	1	1.3025	26.601	2610	1.3025	26.601	2610	1.3025	26.601	2610	1.3025	26.601	2610	1.3025
41.500	17.699	1611	18	0	1	1.3454	26.601	2013	2.122	4270	2.044	0.95061	26.863	0.1103	4065	63.081	151.3	0.20 0.00
COMBUSTOR																		
42.460	148.338	2784	19	0	1	1.3030	26.601	2604	1.3030	26.601	2604	1.3030	26.601	2604	1.3030	26.601	2604	1.3030
42.460	23.047	1771	20	0	1	1.3381	26.600	2104	1.879	3954	2.052	0.94173	26.863	0.1114	3959	57.866	147.4	0.20 0.00
COMBUSTOR																		
44.131	111.296	3114	21	0	1	1.2870	26.998	2717	1.2870	26.998	2717	1.2870	26.998	2717	1.2870	26.998	2717	1.2870
44.131	38.679	2443	22	0	1	1.3095	26.999	2427	1.353	3282	2.099	0.90807	26.863	0.1155	3885	46.320	144.6	0.20 0.34
COMBUSTOR																		
44.310	109.836	3132	23	0	1	1.2860	27.024	2722	1.2860	27.024	2722	1.2860	27.024	2722	1.2860	27.024	2722	1.2860
44.310	39.840	2483	24	0	1	1.3078	27.025	2444	1.322	3231	2.101	0.90660	26.863	0.1157	3878	45.524	144.4	0.20 0.36
COMBUSTOR																		
44.800	106.542	3169	25	0	1	1.2841	27.080	2733	1.2841	27.080	2733	1.2841	27.080	2733	1.2841	27.080	2733	1.2841
44.800	43.014	2579	26	0	1	1.3039	27.082	2485	1.243	3089	2.106	0.90310	26.863	0.1161	3859	43.359	143.7	0.20 0.40
COMBUSTOR																		
44.846	106.403	3168	27	0	1	1.2841	27.081	2733	1.2841	27.081	2733	1.2841	27.081	2733	1.2841	27.081	2733	1.2841
44.846	43.083	2580	28	0	1	1.3039	27.082	2485	1.241	3084	2.106	0.90282	26.863	0.1162	3857	43.276	143.6	0.20 0.40
COMBUSTOR																		
46.250	98.296	2843	29	0	1	1.3014	24.103	2763	1.3014	24.103	2763	1.3014	24.103	2763	1.3014	24.103	2763	1.3014
46.250	45.197	2366	30	0	1	1.3174	24.103	2536	1.138	2886	2.267	0.85983	27.121	0.1231	3858	38.563	142.3	0.49 0.11

READING = 0054 BLOCK = 204 TIME = 280.658 MACH 6.0 PT = 745.999 TT = 2980.6

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	98.243	2845	648.01	895)	1.3013	24.105	2763										
46.260	45.212	2368	481.61	7301	1.3173	24.106	2537	1.138	2885	2.267	0.85927	27.121	0.1232	3859	38.530	142.3	0.49 0.11
COMBUSTOR	0	20	13	4													
47.310	93.980	3086	636.21	975)	1.2896	24.373	2849										
47.310	46.793	2630	474.01	816)	1.3049	24.374	2646	1.077	2849	2.290	0.79943	27.121	0.1325	3989	35.396	147.1	0.49 0.23
COMBUSTOR	0	21	14	3													
47.371	93.565	3112	635.61	983)	1.2883	24.400	2858										
47.371	47.525	2666	476.51	828)	1.3034	24.401	2661	1.060	2822	2.293	0.79428	27.121	0.1333	4001	34.829	147.5	0.49 0.24
COMBUSTOR	0	22	15	4													
48.110	90.059	3307	627.71	1049)	1.2785	24.620	2922										
48.110	51.050	2916	485.31	911)	1.2921	24.622	2758	0.968	2669	2.309	0.74469	27.121	0.1422	4109	30.894	151.5	0.49 0.33
COMBUSTOR	0	23	16	6													
48.811	84.747	3024	641.11	1054)	1.2941	21.953	2977										
48.811	40.889	2554	457.51	874)	1.3101	21.953	2753	1.101	3031	2.488	0.68955	27.410	0.1552	4208	32.484	153.5	0.81 0.18
COMBUSTOR	0	24	17	2													
48.821	84.691	3027	641.01	1055)	1.2940	21.955	2978										
48.821	40.801	2555	456.91	874)	1.3100	21.956	2753	1.103	3035	2.489	0.68864	27.410	0.1554	4210	32.483	153.6	0.81 0.18
COMBUSTOR	0	25	18	4													
49.351	81.943	3146	636.31	1099)	1.2882	22.073	3021										
49.351	36.142	2608	424.81	892)	1.3065	22.074	2770	1.174	3253	2.502	0.64404	27.410	0.1662	4310	32.563	157.2	0.81 0.22
COMBUSTOR	0	26	19	5													
50.761	74.044	3527	624.91	1241)	1.2685	22.452	3147										
50.761	32.200	2941	387.01	1012)	1.2896	22.458	2898	1.191	3450	2.539	0.54890	27.410	0.1950	4547	29.427	165.9	0.81 0.34
COMBUSTOR	0	27	20	4													
52.861	68.289	3803	610.51	1345)	1.2523	22.757	3226										
52.861	22.875	3021	285.61	1036)	1.2824	22.772	2908	1.386	4032	2.562	0.44989	27.410	0.2379	4828	28.187	176.1	0.81 0.43
COMBUSTOR	0	28	21	2													
53.361	68.236	3795	607.41	1341)	1.2527	22.756	3223										
53.361	20.537	2943	255.51	1006)	1.2852	22.771	2874	1.460	4196	2.561	0.43151	27.410	0.2480	4880	28.140	178.0	0.81 0.43
COMBUSTOR	0	29	22	4													
54.111	66.375	3861	603.01	1366)	1.2485	22.832	3240										
54.111	18.942	2968	231.81	1014)	1.2832	22.852	2879	1.497	4310	2.566	0.40675	27.410	0.2631	4948	27.243	180.5	0.81 0.45
COMBUSTOR	0	30	23	4													
54.871	65.091	3902	598.81	1381)	1.2458	22.883	3250										
54.871	17.325	2959	206.21	1010)	1.2828	22.905	2870	1.544	4432	2.570	0.38464	27.410	0.2782	5011	26.495	182.8	0.81 0.47
COMBUSTOR	0	31	24	4													
55.760	63.489	3952	594.31	1400)	1.2423	22.946	3262										
55.760	15.877	2965	181.11	1011)	1.2817	22.972	2868	1.586	4547	2.574	0.36200	27.410	0.2956	5076	25.582	185.2	0.81 0.49
COMBUSTOR	0	32	25	5													
56.296	50.196	4417	591.81	1577)	1.2074	23.444	3363										
56.296	15.004	3542	185.81	1224)	1.2498	23.536	3058	1.474	4508	2.616	0.29085	27.410	0.3679	5254	20.374	191.7	0.81 0.65
COMBUSTOR	0	33	26	5													
56.351	56.921	4065	591.51	1443)	1.2342	23.069	3288										
56.351	11.713	2942	117.11	999)	1.2806	23.107	2847	1.711	4873	2.589	0.29008	27.410	0.3689	5258	21.966	191.8	0.81 0.53
COMBUSTOR	0	34	27	3													
56.491	56.799	4072	590.91	1446)	1.2337	23.078	3290										
56.491	11.599	2943	113.81	1000)	1.2804	23.116	2847	1.716	4886	2.590	0.28805	27.410	0.3715	5266	21.872	192.1	0.81 0.53
COMBUSTOR	0	35	28	7													
56.571	51.220	4395	590.61	1569)	1.2093	23.423	3359										
56.571	14.556	3483	171.51	1202)	1.2530	23.512	3038	1.507	4579	2.613	0.29117	27.410	0.3675	5271	20.721	192.3	0.81 0.64
COMBUSTOR	0	36	29	3													
56.851	52.008	4375	589.31	1561)	1.2110	23.404	3355										
56.851	14.100	3429	158.41	1181)	1.2558	23.489	3019	1.538	4644	2.611	0.29026	27.410	0.3687	5288	20.946	192.9	0.81 0.64
COMBUSTOR	0	37	30	4													
57.077	53.386	4318	588.41	1539)	1.2155	23.345	3343										
57.077	13.407	3317	141.11	1139)	1.2617	23.419	2981	1.587	4731	2.606	0.28976	27.410	0.3693	5299	21.305	193.3	0.81 0.62

P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTH	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4												
57.801	58.465	4108	585.3	11459	1.2312	23.130	3297									
57.801	11.187	2935	88.0	1995	1.2800	23.173	2839	1.757	4989	2.588	0.28516	27.410	0.3753	5325	22.108	194.3 0.81 0.55
COMBUSTOR	0	39	32	8												
58.821	103.847	3349	581.7	11172	1.2768	22.384	3082									
58.821	6.000	1712	-40.8	1558	1.3366	22.387	2254	2.476	5581	2.491	0.28335	27.410	0.3777	5335	24.578	194.7 0.81 0.31
COMBUSTOR	0	40	33	6												
60.831	50.255	4618	575.5	11654	1.1911	23.707	3396									
60.831	16.275	3320	178.1	11329	1.2308	23.853	3131	1.424	4459	2.621	0.29321	27.410	0.3650	5320	20.319	194.1 0.81 0.74
COMBUSTOR	0	41	34	3												
62.251	51.478	4600	570.8	11646	1.1927	23.699	3393									
62.251	16.662	3799	174.9	11320	1.2324	23.837	3125	1.424	4451	2.617	0.30116	27.410	0.3553	5308	20.830	193.7 0.81 0.74
COMBUSTOR	0	42	35	5												
64.715	45.801	4838	561.8	11738	1.1712	23.990	3427									
64.715	19.352	4272	238.1	11503	1.1965	24.197	3241	1.242	4024	2.633	0.28547	27.410	0.3749	5286	17.852	192.9 0.81 0.86
COMBUSTOR	0	43	36	4												
65.091	41.728	4956	560.2	11783	1.1600	24.128	3442									
65.091	20.381	4517	282.0	11599	1.1756	24.361	3292	1.133	3731	2.642	0.26539	27.410	0.4032	5283	15.387	192.8 0.81 0.93
COMBUSTOR	0	44	37	3												
65.091	41.728	5041	630.9	11820	1.1558	24.040	3471									
65.091	22.123	4661	377.7	11660	1.1670	24.272	3338	1.066	3560	2.656	0.26539	27.410	0.4032	5318	14.682	194.0 0.81 0.93
NOZZLE	AE	45	38	5												
87.327	41.728	4956	560.2	11748	1.1600	24.128	3442									
87.327	16.293	2749	-327.4	1899	1.2694	24.610	2685	2.778	7377	2.642	0.05525	27.410	1.9371	6926	6.334	252.7 0.81 0.93
NOZZLE	PO	46	39	5												
87.327	41.728	4956	560.2	11748	1.1600	24.128	3442									
87.327	0.387	2109	-782.7	1666	1.2938	24.611	2348	3.465	8136	2.642	0.02380	27.410	4.4969	7378	3.009	269.2 0.81 0.93
NOZZLE	AE	47	40	5												
87.327	41.728	5041	630.9	11820	1.1558	24.040	3471									
87.327	1.336	2872	-380.1	1946	1.2845	24.608	2709	2.753	7456	2.656	0.05525	27.410	1.9371	7015	6.402	255.9 0.81 0.93
NOZZLE	PO	48	41	5												
87.327	41.728	5041	630.9	11820	1.1558	24.040	3471									
87.327	0.387	2194	-732.3	1696	1.2903	24.611	2392	3.453	8259	2.656	0.02322	27.410	4.6088	7494	2.980	273.4 0.81 0.93
FICTIVE COMBUSTOR	68	61	0													
65.091	270.412	5263	560.2	11903	1.1705	24.474	3538									
65.091	0.387	1444	-1087.8	1435	1.3248	24.894	1955	4.645	9081	2.488	0.03924	27.410	2.7274	8007	5.537	292.1 0.81 1.00
FICTIVE NOZZLE	69	62	0													
87.327	25.595	4876	534.7	11750	1.1564	24.104	3410									
87.327	1.627	3153	-369.2	11053	1.2516	24.602	2824	2.382	6725	2.677	0.05525	27.410	1.9371	6537	5.774	238.5 0.81 0.93

READING = 0054 BLOCK = 204 TIME = 280.658 MACH 6.0 PT = 745.999 IT = 2980.6

XABS	P-IB	P-OB	PDA	GOX	G-IB	G-OB	CAWALL	P-IB/PSO	P-IB/PTO	P-OB/PSO	P-OB/PTO
6.981E-01	1.265E 00	0.000	-4.380E-01	0.000	0.000	0.000	2.470E-02	3.266E 00	1.696E-03	0.000	0.000
1.836E 01	1.265E 00	0.000	-4.203E 01	0.000	0.000	0.000	1.634E 02	3.266E 00	1.696E-03	0.000	0.000
3.070E 01	2.195E 00	0.000	-1.823E 02	0.000	0.000	0.000	5.053E 02	5.666E 00	2.942E-03	0.000	0.000
3.508E 01	3.886E 00	0.000	-3.793E 02	0.000	0.000	0.000	6.804E 02	1.003E 01	5.209E-03	0.000	0.000
3.523E 01	3.961E 00	0.000	-4.481E 02	0.000	0.000	0.000	6.873E 02	1.022E 01	5.306E-03	1.485E 01	7.710E-03
3.555E 01	4.115E 00	0.000	-4.554E 02	0.000	0.000	0.000	7.189E 02	1.062E 01	5.516E-03	1.475E 01	5.113E-03
3.590E 01	4.012E 00	0.000	-4.730E 02	0.000	0.000	0.000	7.545E 02	1.036E 01	5.378E-03	4.88E 00	2.279E-03
3.606E 01	3.965E 00	0.000	-4.820E 02	0.000	0.000	0.000	7.708E 02	1.024E 01	5.315E-03	6.796E 00	3.529E-03
3.648E 01	4.237E 00	0.000	-5.006E 02	0.000	0.000	0.000	8.143E 02	1.094E 01	5.600E-03	1.314E 01	6.825E-03
3.701E 01	4.425E 00	0.000	-5.213E 02	0.000	0.000	0.000	8.704E 02	1.142E 01	5.932E-03	2.116E 01	1.099E-02
3.704E 01	4.420E 00	0.000	-5.224E 02	0.000	0.000	0.000	8.738E 02	1.141E 01	5.926E-03	2.162E 01	1.123E-02
3.736E 01	4.373E 00	0.000	-5.336E 02	0.000	0.000	0.000	9.081E 02	1.129E 01	5.862E-03	2.062E 01	1.071E-02
3.789E 01	4.295E 00	0.000	-5.520E 02	0.000	0.000	0.000	9.658E 02	1.109E 01	5.758E-03	2.885E 01	1.498E-02
3.803E 01	4.275E 00	0.000	-5.542E 02	0.000	0.000	0.000	9.812E 02	1.104E 01	5.731E-03	2.901E 01	1.506E-02
3.838E 01	6.013E 00	0.000	-5.618E 02	0.000	0.000	0.000	1.020E 03	1.552E 01	8.060E-03	2.941E 01	1.527E-02
3.875E 01	7.842E 00	0.000	-5.705E 02	0.000	0.000	0.000	1.062E 03	2.024E 01	1.051E-02	3.728E 01	1.936E-02
3.885E 01	8.341E 00	0.000	-5.717E 02	0.000	0.000	0.000	1.073E 03	2.153E 01	1.118E-02	3.943E 01	2.048E-02
3.901E 01	9.130E 00	0.000	-5.722E 02	0.000	0.000	0.000	1.092E 03	2.357E 01	1.224E-02	4.031E 01	2.093E-02
3.936E 01	1.526E 01	0.000	-5.805E 02	0.000	0.000	0.000	1.132E 03	3.938E 01	2.045E-02	4.224E 01	2.193E-02
3.950E 01	1.769E 01	0.000	-5.871E 02	0.000	0.000	0.000	1.148E 03	4.566E 01	2.371E-02	3.931E 01	2.041E-02
3.985E 01	1.800E 01	0.000	-6.051E 02	0.000	0.000	0.000	1.189E 03	4.646E 01	2.412E-02	3.195E 01	1.659E-02
4.000E 01	1.813E 01	0.000	-6.143E 02	0.000	0.000	0.000	1.207E 03	4.680E 01	2.430E-02	2.497E 01	1.297E-02
4.035E 01	2.111E 01	0.000	-6.143E 02	0.000	0.000	0.000	1.248E 03	5.451E 01	2.830E-02	8.583E 00	4.457E-03
4.040E 01	2.155E 01	0.000	-6.520E 02	0.000	0.000	0.000	1.255E 03	5.559E 01	2.887E-02	8.601E 00	4.466E-03
4.041E 01	2.162E 01	0.000	-6.530E 02	0.000	0.000	0.000	1.255E 03	5.581E 01	2.898E-02	8.604E 00	4.468E-03
4.134E 01	2.950E 01	0.000	-7.715E 02	0.000	0.000	0.000	1.364E 03	7.616E 01	3.955E-02	8.928E 00	4.636E-03
4.135E 01	2.959E 01	0.000	-7.728E 02	0.000	0.000	0.000	1.375E 03	7.638E 01	3.966E-02	8.932E 00	4.638E-03
4.141E 01	3.014E 01	0.000	-7.818E 02	0.000	0.000	0.000	1.375E 03	7.781E 01	4.040E-02	8.954E 00	4.650E-03
4.150E 01	3.090E 01	0.000	-7.940E 02	0.000	0.000	0.000	1.384E 03	7.977E 01	4.142E-02	1.161E 01	6.030E-03
4.246E 01	3.052E 01	0.000	-8.833E 02	0.000	0.000	0.000	1.499E 03	7.880E 01	4.092E-02	4.019E 01	2.087E-02
4.413E 01	4.252E 01	0.000	-9.300E 02	0.000	0.000	0.000	1.701E 03	1.098E 02	5.700E-02	8.993E 01	4.670E-02
4.431E 01	4.381E 01	0.000	-9.337E 02	0.000	0.000	0.000	1.723E 03	1.131E 02	5.872E-02	9.260E 01	4.809E-02
4.480E 01	4.732E 01	0.000	-9.455E 02	0.000	0.000	0.000	1.782E 03	1.222E 02	6.344E-02	9.991E 01	5.188E-02
4.485E 01	4.720E 01	0.000	-9.465E 02	0.000	0.000	0.000	1.788E 03	1.218E 02	6.327E-02	1.006E 02	5.223E-02
4.625E 01	4.332E 01	0.000	-8.797E 02	0.000	0.000	0.000	1.960E 03	1.118E 02	5.807E-02	1.215E 02	6.311E-02
4.626E 01	4.329E 01	0.000	-8.787E 02	0.000	0.000	0.000	1.962E 03	1.118E 02	5.803E-02	1.217E 02	6.318E-02
4.731E 01	4.039E 01	0.000	-7.352E 02	0.000	0.000	0.000	2.092E 03	1.043E 02	5.414E-02	1.373E 02	7.131E-02
4.737E 01	4.150E 01	0.000	-7.223E 02	0.000	0.000	0.000	2.099E 03	1.071E 02	5.535E-02	1.382E 02	7.178E-02
4.811E 01	5.505E 01	0.000	-6.052E 02	0.000	0.000	0.000	2.192E 03	1.421E 02	5.481E-02	1.215E 02	6.307E-02
4.881E 01	4.089E 01	0.000	-4.615E 02	0.000	0.000	0.000	2.279E 03	1.056E 02	5.469E-02	1.056E 02	5.481E-02
4.882E 01	4.080E 01	0.000	-4.593E 02	0.000	0.000	0.000	2.280E 03	1.053E 02	5.469E-02	1.053E 02	5.469E-02
4.935E 01	3.614E 01	0.000	-3.530E 02	0.000	0.000	0.000	2.347E 03	9.330E 01	4.845E-02	9.330E 01	4.845E-02
5.076E 01	3.220E 01	0.000	-1.004E 02	0.000	0.000	0.000	2.524E 03	8.312E 01	4.316E-02	8.312E 01	4.316E-02
5.286E 01	2.287E 01	0.000	2.028E 02	0.000	0.000	0.000	2.791E 03	5.905E 01	3.066E-02	5.905E 01	3.066E-02
5.336E 01	2.054E 01	0.000	2.054E 02	0.000	0.000	0.000	2.855E 03	5.302E 01	2.753E-02	5.302E 01	2.753E-02
5.411E 01	1.894E 01	0.000	3.356E 02	0.000	0.000	0.000	2.950E 03	4.890E 01	2.539E-02	4.890E 01	2.539E-02
5.487E 01	1.732E 01	0.000	4.059E 02	0.000	0.000	0.000	3.048E 03	4.472E 01	2.322E-02	4.472E 01	2.322E-02
5.576E 01	1.588E 01	0.000	4.799E 02	0.000	0.000	0.000	3.162E 03	4.098E 01	2.128E-02	4.098E 01	2.128E-02
5.630E 01	1.500E 01	0.000	6.611E 02	0.000	0.000	0.000	3.209E 03	3.873E 01	2.011E-02	3.873E 01	2.011E-02
5.635E 01	8.512E 00	0.000	6.653E 02	0.000	0.000	0.000	3.216E 03	2.197E 01	1.914E-02	3.850E 01	1.999E-02
5.649E 01	8.512E 00	0.000	6.758E 02	0.000	0.000	0.000	3.234E 03	2.197E 01	1.914E-02	3.791E 01	1.969E-02
5.657E 01	1.456E 01	0.000	6.808E 02	0.000	0.000	0.000	3.244E 03	3.768E 01	1.951E-02	3.758E 01	1.951E-02
5.685E 01	1.410E 01	0.000	6.995E 02	0.000	0.000	0.000	3.280E 03	3.640E 01	1.890E-02	3.640E 01	1.890E-02
5.708E 01	1.341E 01	0.000	7.129E 02	0.000	0.000	0.000	3.309E 03	3.461E 01	1.797E-02	3.461E 01	1.797E-02
5.780E 01	1.119E 01	0.000	7.463E 02	0.000	0.000	0.000	3.402E 03	2.888E 01	1.500E-02	2.888E 01	1.500E-02



XABS	P-IB	P-OB	PDA	GOX	Q-IB	Q-OB	CAVALL	P-IB/PS0	P-IB/PT0	P-OB/PS0	P-OB/PT0
5.882E 01	6.000E 00	6.000E 00	7.662E 02	-3.935E 03	-1.707E 03	-2.227E 03	3.532E 03	1.549E 01	8.043E-03	1.549E 01	8.043E-03
6.083E 01	1.627E 01	1.627E 01	7.688E 02	-4.107E 03	-1.751E 03	-2.356E 03	3.790E 03	4.201E 01	2.182E-02	4.201E 01	2.182E-02
6.225E 01	1.666E 01	1.666E 01	7.688E 02	-4.235E 03	-1.780E 03	-2.455E 03	3.972E 03	4.301E 01	2.234E-02	4.301E 01	2.234E-02
6.471E 01	1.935E 01	1.935E 01	7.688E 02	-4.483E 03	-1.849E 03	-2.634E 03	4.289E 03	4.996E 01	2.594E-02	4.996E 01	2.594E-02
6.509E 01	1.976E 01	1.976E 01	7.688E 02	-4.525E 03	-1.862E 03	-2.664E 03	4.337E 03	5.421E 01	2.815E-02	5.421E 01	2.815E-02
6.513E 01	2.100E 01	1.981E 01	7.688E 02	-4.530E 03	-1.863E 03	-2.667E 03	4.342E 03	5.421E 01	2.815E-02	5.421E 01	2.815E-02
6.533E 01	1.996E 01	2.002E 01	7.688E 02	-4.552E 03	-1.870E 03	-2.682E 03	4.368E 03	5.153E 01	2.676E-02	5.153E 01	2.676E-02
6.699E 01	1.136E 01	9.770E 00	9.378E 02	-4.710E 03	-1.917E 03	-2.793E 03	4.583E 03	2.933E 01	1.523E-02	2.933E 01	1.523E-02
6.766E 01	8.198E 00	9.450E 00	1.134E 03	-4.761E 03	-1.932E 03	-2.830E 03	4.655E 03	2.116E 01	1.099E-02	2.116E 01	1.099E-02
6.843E 01	4.595E 00	7.140E 00	1.335E 03	-4.818E 03	-1.946E 03	-2.872E 03	4.750E 03	1.178E 01	6.119E-03	1.178E 01	6.119E-03
6.915E 01	3.642E 00	4.980E 00	1.464E 03	-4.872E 03	-1.957E 03	-2.915E 03	4.848E 03	9.402E 00	4.882E-03	9.402E 00	4.882E-03
6.975E 01	2.880E 00	4.184E 00	1.548E 03	-4.916E 03	-1.964E 03	-2.953E 03	4.922E 03	7.383E 00	3.834E-03	7.383E 00	3.834E-03
7.071E 01	2.113E 00	2.945E 00	1.643E 03	-4.981E 03	-1.972E 03	-3.009E 03	5.036E 03	5.455E 00	2.833E-03	5.455E 00	2.833E-03
7.114E 01	1.775E 00	2.725E 00	1.676E 03	-5.007E 03	-1.975E 03	-3.031E 03	5.088E 03	4.582E 00	2.379E-03	4.582E 00	2.379E-03
7.267E 01	1.347E 00	1.940E 00	1.767E 03	-5.075E 03	-1.985E 03	-3.090E 03	5.273E 03	3.477E 00	1.806E-03	3.477E 00	1.806E-03
7.282E 01	1.305E 00	1.762E 00	1.774E 03	-5.080E 03	-1.986E 03	-3.094E 03	5.290E 03	3.369E 00	1.749E-03	3.369E 00	1.749E-03
7.357E 01	1.300E 00	8.700E-01	1.818E 03	-5.108E 03	-1.990E 03	-3.118E 03	5.374E 03	3.355E 00	1.742E-03	3.355E 00	1.742E-03
7.357E 01	1.300E 00	8.652E-01	1.820E 03	-5.108E 03	-1.990E 03	-3.118E 03	5.375E 03	3.355E 00	1.742E-03	3.355E 00	1.742E-03
7.490E 01	1.290E 00	0.000	1.847E 03	-5.163E 03	-1.996E 03	-3.167E 03	5.426E 03	3.330E 00	1.729E-03	3.330E 00	1.729E-03
7.775E 01	2.270E 00	0.000	1.918E 03	-5.175E 03	-2.009E 03	-3.167E 03	5.525E 03	5.860E 00	3.043E-03	5.860E 00	3.043E-03
8.165E 01	1.645E 00	0.000	2.002E 03	-5.189E 03	-2.023E 03	-3.167E 03	5.630E 03	4.247E 00	2.205E-03	4.247E 00	2.205E-03
8.445E 01	1.230E 00	0.000	2.034E 03	-5.202E 03	-2.036E 03	-3.167E 03	5.684E 03	3.175E 00	1.649E-03	3.175E 00	1.649E-03
8.735E 01	1.715E 00	0.000	2.070E 03	-5.224E 03	-2.058E 03	-3.167E 03	5.707E 03	4.427E 00	2.299E-03	4.427E 00	2.299E-03
8.735E 01	1.716E 00	0.000	2.070E 03	-5.224E 03	-2.058E 03	-3.167E 03	5.707E 03	4.430E 00	2.300E-03	4.430E 00	2.300E-03

READING = 0054 BLOCK = 204 TIME = 280.658 MACH 6.0 PT = 745.999 TT = 2988.6

X	DDRAG	CORAG	CF	HC
4.040E 01	1.195E 02	1.195E 02	2.249E-03	4.452E-02
4.041E 01	1.903E-01	1.197E 02	2.523E-03	3.519E-02
4.134E 01	1.891E 01	1.366E 02	2.687E-03	4.213E-02
4.135E 01	1.939E-01	1.388E 02	2.480E-03	4.473E-02
4.141E 01	1.220E 00	1.400E 02	2.455E-03	4.555E-02
4.150E 01	1.657E 00	1.417E 02	2.463E-03	4.711E-02
4.246E 01	1.738E 01	1.591E 02	2.541E-03	5.419E-02
4.413E 01	2.727E 01	1.863E 02	2.637E-03	6.904E-02
4.431E 01	2.734E 00	1.891E 02	2.838E-03	6.492E-02
4.480E 01	7.565E 00	1.966E 02	2.855E-03	6.600E-02
4.485E 01	6.971E-01	1.973E 02	2.880E-03	6.542E-02
4.625E 01	2.146E 01	2.188E 02	3.202E-03	6.118E-02
4.626E 01	1.450E-01	2.189E 02	2.843E-03	6.951E-02
4.731E 01	1.358E 01	2.325E 02	2.801E-03	7.039E-02
4.737E 01	7.553E-01	2.333E 02	2.932E-03	6.737E-02
4.811E 01	8.896E 00	2.422E 02	2.943E-03	6.746E-02
4.881E 01	8.573E 00	2.507E 02	3.229E-03	5.780E-02
4.882E 01	1.250E-01	2.509E 02	2.917E-03	6.449E-02
4.935E 01	6.245E 00	2.571E 02	2.868E-03	6.160E-02
5.076E 01	1.564E 01	2.728E 02	2.866E-03	5.672E-02
5.286E 01	2.178E 01	2.945E 02	2.851E-03	4.516E-02
5.336E 01	5.211E 00	2.997E 02	2.955E-03	4.069E-02
5.411E 01	7.795E 00	3.075E 02	2.920E-03	3.873E-02
5.487E 01	7.641E 00	3.152E 02	2.921E-03	3.627E-02
5.576E 01	8.677E 00	3.239E 02	2.910E-03	3.406E-02
5.630E 01	3.153E 00	3.270E 02	2.879E-03	3.083E-02
5.635E 01	4.429E-01	3.275E 02	3.060E-03	2.520E-02
5.649E 01	1.158E 00	3.286E 02	2.885E-03	2.630E-02
5.657E 01	6.777E-01	3.293E 02	3.333E-03	2.654E-02
5.685E 01	2.369E 00	3.317E 02	3.043E-03	2.617E-02
5.708E 01	1.847E 00	3.335E 02	3.021E-03	2.751E-02
5.780E 01	6.014E 00	3.395E 02	2.961E-03	2.494E-02
5.882E 01	8.849E 00	3.484E 02	2.839E-03	1.692E-02
6.083E 01	1.563E 01	3.640E 02	2.562E-03	3.571E-02
6.225E 01	1.064E 01	3.746E 02	3.116E-03	3.016E-02
6.471E 01	1.920E 01	3.938E 02	3.163E-03	3.130E-02
6.509E 01	2.599E 00	3.964E 02	3.320E-03	2.963E-02
6.513E 01	2.670E-01	3.967E 02	3.441E-03	2.988E-02
6.533E 01	1.364E 00	3.981E 02	3.437E-03	2.972E-02
6.699E 01	1.160E 01	4.097E 02	3.346E-03	2.266E-02
6.766E 01	4.320E 00	4.140E 02	3.323E-03	2.002E-02
6.843E 01	4.548E 00	4.185E 02	3.270E-03	1.540E-02
6.915E 01	3.643E 00	4.222E 02	3.229E-03	1.249E-02
6.976E 01	2.713E 00	4.249E 02	3.202E-03	1.082E-02
7.071E 01	3.649E 00	4.285E 02	3.157E-03	8.501E-03
7.114E 01	1.462E 00	4.300E 02	3.142E-03	7.796E-03
7.267E 01	4.576E 00	4.346E 02	3.098E-03	6.151E-03
7.282E 01	3.803E-01	4.350E 02	3.089E-03	5.834E-03
7.357E 01	1.645E 00	4.366E 02	3.040E-03	4.469E-03
7.357E 01	2.811E-03	4.366E 02	3.040E-03	4.462E-03
7.490E 01	9.509E-01	4.376E 02	3.054E-03	5.093E-03
7.775E 01	2.272E 00	4.398E 02	3.111E-03	7.758E-03
8.165E 01	2.580E 00	4.424E 02	3.048E-03	6.051E-03
8.446E 01	1.108E 00	4.435E 02	2.997E-03	4.624E-03
8.732E 01	4.646E-01	4.440E 02	3.026E-03	6.186E-03
8.733E 01	0.000	4.440E 02	3.027E-03	6.189E-03

## RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1536. (LBF)  
 MEASURED THRUST..... 1329. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 2116. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1831. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.6160  
 MEASURED THRUST COEFFICIENT..... 0.5333

## REGENERATIVE-COOLED ENGINE PERFORMANCE

## CALCULATED

STREAM THRUST..... 6621. (LBF)  
 NET THRUST..... 1620. (LBF)  
 SPECIFIC IMPULSE..... 2231. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.6498

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 119.5 (LBF)  
 INLET MOMENTUM CHANGE..... -771.5 (LBF)  
 COMBUSTOR FRICTION DRAG..... 276.9 (LBF)  
 COMBUSTOR STRUT DRAG..... 8.85 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 1054. (LBF)  
 NOZZLE FRICTION DRAG..... 47.55 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1253. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1301. (LBF)  
 EXTERNAL FRICTION DRAG..... 60.83 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -971. (LBF)  
 TOTAL EXTERNAL DRAG..... -1032. (LBF)  
 TOTAL STRUT DRAG..... 8.85 (LBF)  
 CAVITY FORCE..... -1153. (LBF)  
 CALCULATED LOAD CELL FORCE..... -649. (LBF)  
 MEASURED LOAD CELL FORCE..... -855. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE 0.0, -172.2, -126.7,

## STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3507 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.235 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.575 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.327 (IN)  
 STRUT LEADING EDGE..... 56.491 (IN)  
 STRUT TRAILING EDGE..... 65.091 (IN)  
 COMBUSTOR EXIT..... 65.091 (IN)

## INLET

ANGLE OF ATTACK ..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9829  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1608  
 DELTA PT2..... 0.1198 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3625  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1631  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8897  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9043  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9342  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8876  
 ENTHALPY AT P0 - SUPERSONIC..... -1.95 (BTU/LBM)  
 ENTHALPY AT P0 - SUBSONIC..... 30.55 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0272  
 EQUIVALENCE RATIO..... 0.813  
 COMBUSTOR EFFICIENCY..... 0.930  
 TOTAL PRESSURE RATIO..... 0.1543  
 COMBUSTOR EFFECTIVENESS..... 0.8334  
 INJECTOR DISCHARGE COEFFICIENTS 0.8520, 0.7266, 0.7888, 0.6843

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS..... 0.9438  
 NOZZLE COEFFICIENT - CT..... 0.8599  
 PROCESS EFFICIENCY..... 0.8601  
 KINETIC ENERGY EFFICIENCY..... 0.8731

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.336	B
1C	44.300	
2A	48.811	D
2C	46.250	E
3A	54.101	
3B	56.286	
4	44.836	

Reading 57

$t = 195,11 \text{ sec.}$

READING = 0037 BLOCK = 78 TIME = 195.113 MACH 6.0 PI = 745.249 TT = 3048.1  
 RAMJET PERFORMANCE

## SUMMARY REPORT

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	N	A/VAC	MUMTM	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	745.249	3048	684.0( 80)	1.2912	28.966	2599											
0.000	0.397	410	28.6( 100)	1.3990	28.965	1002	5.961	5971	1.832	0.10629	26.712	0.9811	5037	9.864	189.3		
SPIKE TIP	2	0	3														
0.600	17.875	3048	684.0( 80)	1.2910	28.965	2599											
0.600	16.068	2975	662.0( 78)	1.2934	28.965	2570	0.409	1050	2.088	0.10629	26.712	0.9811	4910	1.735	183.6		
WIND TUNNEL	3	0	0														
0.000	745.249	3048	684.0( 80)	1.2912	28.966	2599											
0.000	0.377	412	30.1( 99)	1.3989	28.965	994	6.012	5978	1.832	0.10247	25.751	0.9811	4879	9.819	189.5		
SPIKE TIP	4	0	0														
0.600	17.875	3048	684.0( 80)	1.2910	28.965	2599											
0.600	16.213	2981	663.0( 78)	1.2932	28.965	2573	0.391	1005	2.088	0.10247	25.751	0.9811	4879	1.601	189.5		
INLET THROAT	5	0	4														
40.400	287.699	3013	673.3( 78)	1.2923	28.966	2585											
40.400	16.044	1496	241.0( 370)	1.3481	28.965	1861	2.590	4631	1.894	0.93500	26.712	0.1115	4320	67.878	161.7		
INLET UPNRSK	6	0	3														
40.400	287.699	3013	673.3( 78)	1.2923	28.966	2585											
40.400	13.781	1438	225.7( 335)	1.3514	28.965	1826	2.591	4732	1.894	0.85000	26.712	0.1227	4362	62.512	163.3		
INLET DNRSK	7	0	4														
40.400	123.350	3013	673.3( 78)	1.2923	28.966	2585											
40.400	105.880	2910	642.3( 78)	1.2956	28.966	2544	0.490	1246	1.952	0.85000	26.712	0.1227	4362	16.463	163.3		
COMBUSTOR	8	0	1														
40.410	286.921	3013	673.3( 78)	1.2923	28.966	2585											
40.410	15.067	1497	241.5( 370)	1.3480	28.965	1861	2.497	4648	1.894	0.93488	26.712	0.1116	4318	67.535	161.7		
COMBUSTOR	9	0	4														
41.302	225.520	3005	671.1( 78)	1.2926	28.966	2582											
41.302	15.582	1643	280.5( 409)	1.3404	28.965	1944	2.274	4821	1.909	0.93718	26.712	0.1113	4200	64.390	157.2		
COMBUSTOR	10	0	3														
41.367	225.134	3005	670.9( 78)	1.2926	28.966	2582											
41.367	16.763	1653	283.1( 412)	1.3399	28.965	1950											
COMBUSTOR	11	4	4														
41.500	216.738	3003	670.4( 78)	1.2926	28.966	2581											
41.500	19.158	1673	286.6( 417)	1.3390	28.965	1961	2.249	4371	1.912	0.93828	26.712	0.1111	4175	63.740	156.3		
COMBUSTOR	12	5	5														
42.460	191.789	2991	666.7( 78)	1.2930	28.966	2576											
42.460	20.582	1753	310.3( 439)	1.3393	28.965	2004	2.107	4223	1.920	0.92946	26.712	0.1122	4097	60.998	153.4		
COMBUSTOR	13	6	4														
44.087	173.454	2968	659.7( 78)	1.2937	28.966	2567											
44.087	20.720	1785	319.1( 448)	1.3340	28.965	2022	2.042	4128	1.924	0.89811	26.712	0.1161	4043	57.615	151.4		
COMBUSTOR	14	7	4														
44.310	171.361	2965	658.7( 78)	1.2938	28.966	2566											
44.310	20.807	1790	320.6( 449)	1.3337	28.965	2025	2.032	4114	1.925	0.89609	26.712	0.1164	4035	57.284	151.1		
COMBUSTOR	15	8	4														
44.800	166.304	2958	656.7( 78)	1.2941	28.966	2563											
44.800	21.085	1805	324.7( 453)	1.3331	28.965	2033	2.005	4076	1.926	0.89232	26.712	0.1169	4015	56.525	150.3		
COMBUSTOR	16	9	4														
44.802	166.306	2958	656.7( 78)	1.2941	28.966	2563											
44.802	21.097	1806	324.8( 454)	1.3331	28.965	2033	2.005	4076	1.926	0.89262	26.712	0.1168	4015	56.530	150.3		
COMBUSTOR	17	10	5														
46.260	146.477	2939	651.1( 77)	1.2946	28.966	2556											
46.260	20.585	1833	332.4( 461)	1.3321	28.965	2047	1.931	3994	1.932	0.84049	26.712	0.1241	3970	52.164	148.6		
COMBUSTOR	18	11	5														
47.310	135.449	2926	647.3( 77)	1.2950	28.966	2551											
47.310	19.384	1839	334.0( 463)	1.3318	28.965	2050	1.931	3959	1.937	0.78223	26.712	0.1333	3949	48.132	147.8		

READING = 0057 BLOCK = 78 TIME = 195.113 MACH 6.0 PT = 745.249 IT = 304H.1

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/VAC	MUMIM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	5													
47.327	135.201	2926	647.2	773	1.2951	28.966	2550										
47.327	19.295	1838	333.6	462	1.3319	28.965	2050	1.933	3961	1.937	0.77962	26.712	0.1338	3950	47.996	147.9	
COMBUSTOR	0	20	13	5													
48.110	127.596	2917	644.4	770	1.2953	28.966	2547										
48.110	17.845	1822	329.3	458	1.3325	28.965	2041	1.945	3971	1.940	0.72894	26.712	0.1431	3951	44.983	147.9	
COMBUSTOR	0	21	14	4													
48.777	122.392	2910	642.2	768	1.2956	28.966	2544										
48.777	15.857	1783	318.5	447	1.3341	28.965	2020	1.992	4025	1.942	0.67109	26.712	0.1354	3973	41.975	146.7	
COMBUSTOR	0	22	15	4													
49.307	119.593	2904	640.5	766	1.2958	28.966	2541										
49.307	14.331	1744	307.8	437	1.3357	28.965	2000	2.041	4080	1.943	0.62763	26.712	0.1662	3996	39.796	149.6	
COMBUSTOR	0	23	16	5													
50.717	111.364	2891	636.6	762	1.2962	28.966	2536										
50.717	11.376	1667	287.0	416	1.3392	28.965	1958	2.136	4182	1.947	0.53491	26.712	0.1950	4040	34.768	151.3	
COMBUSTOR	0	24	17	4													
52.817	99.928	2875	631.8	758	1.2967	28.966	2530										
52.817	8.706	1591	266.5	395	1.3430	28.965	1915	2.232	4275	1.952	0.43842	26.712	0.2379	4080	29.130	152.7	
COMBUSTOR	0	25	18	4													
53.317	98.354	2872	630.8	757	1.2968	28.966	2528										
53.317	8.186	1571	261.1	390	1.3441	28.965	1904	2.259	4301	1.953	0.42050	26.712	0.2480	4091	28.106	153.2	
COMBUSTOR	0	26	19	4													
54.067	96.096	2867	629.3	753	1.2969	28.966	2526										
54.067	7.531	1544	253.8	383	1.3455	28.965	1888	2.296	4335	1.954	0.39638	26.712	0.2631	4106	26.704	153.7	
COMBUSTOR	0	27	20	4													
54.827	93.823	2862	628.0	754	1.2971	28.966	2524										
54.827	6.962	1520	247.3	376	1.3468	28.965	1874	2.329	4364	1.955	0.37484	26.712	0.2782	4119	25.423	154.2	
COMBUSTOR	0	28	21	5													
55.760	90.945	2857	626.5	753	1.2972	28.966	2522										
55.760	6.188	1495	240.8	370	1.3482	28.965	1860	2.362	4393	1.957	0.35176	26.712	0.2965	4132	24.014	154.7	
COMBUSTOR	0	29	22	4													
56.252	78.210	2855	625.8	752	1.2973	28.966	2521										
56.252	4.934	1453	229.6	358	1.3506	28.965	1835	2.426	4452	1.967	0.28344	26.712	0.3679	4161	19.611	155.8	
COMBUSTOR	0	30	23	5													
56.307	78.136	2855	623.7	752	1.2973	28.966	2521										
56.307	4.916	1452	229.3	358	1.3506	28.965	1835	2.428	4454	1.967	0.28269	26.712	0.3689	4162	19.565	155.8	
COMBUSTOR	0	31	24	5													
56.447	77.846	2854	625.5	752	1.2973	28.966	2521										
56.447	4.967	1449	228.6	357	1.3508	28.965	1833	2.431	4457	1.967	0.28061	26.712	0.3717	4163	19.434	155.9	
COMBUSTOR	0	32	25	4													
56.527	78.889	2854	625.4	751	1.2973	28.966	2521										
56.527	4.916	1447	228.2	357	1.3509	28.965	1832	2.433	4458	1.968	0.28380	26.712	0.3675	4164	19.662	155.9	
COMBUSTOR	0	33	26	5													
56.807	79.125	2853	625.1	751	1.2974	28.966	2520										
56.807	4.881	1443	227.1	356	1.3511	28.965	1829	2.439	4463	1.966	0.28296	26.712	0.3686	4166	19.624	156.0	
COMBUSTOR	0	34	27	5													
57.033	79.243	2852	624.8	751	1.2974	28.966	2520										
57.033	4.856	1440	226.3	355	1.3513	28.965	1828	2.443	4466	1.966	0.28228	26.712	0.3695	4167	19.590	156.0	
COMBUSTOR	0	35	28	5													
57.757	78.712	2849	623.9	750	1.2975	28.966	2519										
57.757	4.750	1433	224.3	353	1.3517	28.965	1823	2.453	4472	1.966	0.27790	26.712	0.3753	4169	19.312	156.1	
COMBUSTOR	0	36	29	4													
58.777	78.666	2845	622.8	749	1.2976	28.966	2517										
58.777	4.696	1427	222.7	351	1.3521	28.965	1820	2.459	4474	1.966	0.27613	26.712	0.3777	4169	19.201	156.1	
COMBUSTOR	0	37	30	5													
60.787	79.926	2838	620.8	747	1.2978	28.966	2515										
60.787	4.904	1433	224.4	353	1.3517	28.965	1823	2.443	4454	1.964	0.28574	26.712	0.3650	4156	19.778	155.6	

	P	T	M	GAMMA	MDLWT	SONV	MACH	VEL	S	A/A	N	A/AC	MUMTM	O	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	5													
62.207	80.845	2434	619.6	(746)	1.2980	28.966	2513										
62.207	5.079	1439	226.1	(355)	1.3513	28.965	1827	2.429	4438	1.963	0.29348	26.712	0.3553	4146	20.240	155.2	
COMBUSTOR	0	39	32	4													
64.671	74.722	2827	617.4	(744)	1.2982	28.966	2510										
64.671	4.879	1450	228.8	(358)	1.3507	28.965	1833	2.405	4410	1.967	0.27819	26.712	0.3749	4130	19.065	154.6	
COMBUSTOR	0	40	33	3													
65.047	69.224	2826	617.1	(743)	1.2982	28.966	2509										
65.047	4.544	1451	229.2	(358)	1.3507	28.965	1834	2.402	4406	1.972	0.25862	26.712	0.4032	4127	17.708	154.5	
NOZZLE	AE	41	34	3													
67.283	69.224	2826	617.1	(743)	1.2982	28.966	2509										
67.283	0.406	752	82.2	(181)	1.3918	28.965	1341	3.966	5317	1.972	0.05384	26.712	1.9371	4616	4.448	172.8	
NOZZLE	PO	42	35	3													
67.283	69.224	2826	617.1	(743)	1.2982	28.966	2509										
67.283	0.397	747	51.0	(180)	1.3921	28.965	1336	3.983	5322	1.972	0.05399	26.712	1.9683	4619	4.383	172.4	
PCTIVE COMBUSTOR	62	55	0														
65.047	287.699	2826	617.1	(743)	1.2982	28.966	2509										
65.047	0.397	499	9.1	(120)	1.3990	28.965	1094	5.115	5598	1.875	0.08351	26.712	1.2489	4774	7.265	170.7	
PCTIVE NOZZLE	63	56	0														
67.283	68.905	2803	610.2	(737)	1.2990	28.966	2500										
67.283	0.404	745	50.3	(179)	1.3922	28.965	1334	3.968	5293	1.970	0.05384	26.712	1.9371	4595	4.429	172.0	

XABS	P-IB	P-OB	PDA	GOX	G-IB	G-OB	CANALL	P-IB/PSU	P-IB/PTIO	P-OB/PSU	P-OB/PTIO
6.981E-01	1.035E 00	0.000	-4.360E-01	0.000	0.000	0.000	2.470E-02	2.658E 00	1.416E-03	0.000	0.000
1.836E 01	1.055E 00	0.000	-3.512E 01	0.000	0.000	0.000	1.631E 02	2.658E 00	1.416E-03	0.000	0.000
3.707E 01	2.175E 00	0.000	-1.661E 02	0.000	0.000	0.000	5.053E 02	5.480E 00	2.918E-03	0.000	0.000
3.502E 01	3.907E 00	0.000	-3.632E 02	0.000	0.000	0.000	6.805E 02	9.845E 00	5.243E-03	0.000	0.000
3.312E 01	3.921E 00	0.000	-4.299E 02	0.000	0.000	0.000	6.855E 02	9.880E 00	5.262E-03	0.000	0.000
3.519E 01	3.922E 00	0.000	-4.299E 02	0.000	0.000	0.000	6.855E 02	9.880E 00	5.262E-03	0.000	0.000
3.552E 01	3.922E 00	0.000	-4.299E 02	0.000	0.000	0.000	7.213E 02	1.000E 01	5.327E-03	0.695E 00	7.737E-03
3.582E 01	3.922E 00	0.000	-4.299E 02	0.000	0.000	0.000	7.525E 02	9.881E 00	5.362E-03	3.905E 00	2.080E-03
3.605E 01	3.890E 00	0.000	-4.651E 02	0.000	0.000	0.000	7.733E 02	9.801E 00	5.320E-03	5.864E 00	3.128E-03
3.642E 01	4.202E 00	0.000	-4.655E 02	0.000	0.000	0.000	8.169E 02	1.059E 01	5.641E-03	9.913E 00	5.280E-03
3.701E 01	4.198E 00	0.000	-5.130E 02	0.000	0.000	0.000	8.730E 02	1.068E 01	5.622E-03	1.502E 01	8.001E-03
3.732E 01	4.036E 00	0.000	-5.254E 02	0.000	0.000	0.000	9.059E 02	1.017E 01	5.318E-03	1.798E 01	9.577E-03
3.802E 01	3.685E 00	0.000	-5.407E 02	0.000	0.000	0.000	9.835E 02	9.284E 00	4.945E-03	3.192E 01	1.700E-02
3.832E 01	4.826E 00	0.000	-5.384E 02	0.000	0.000	0.000	1.016E 03	1.216E 01	6.476E-03	3.792E 01	2.019E-02
3.872E 01	6.362E 00	0.000	-5.358E 02	0.000	0.000	0.000	1.065E 03	1.653E 01	6.538E-03	3.709E 01	1.975E-02
3.882E 01	6.372E 00	0.000	-5.355E 02	0.000	0.000	0.000	1.072E 03	1.658E 01	6.522E-03	3.697E 01	1.969E-02
3.901E 01	7.330E 00	0.000	-5.331E 02	0.000	0.000	0.000	1.094E 03	1.847E 01	6.536E-03	3.838E 01	2.044E-02
3.932E 01	1.593E 01	0.000	-5.335E 02	0.000	0.000	0.000	1.135E 03	3.270E 01	1.742E-02	4.050E 01	2.137E-02
3.952E 01	1.635E 01	0.000	-5.433E 02	0.000	0.000	0.000	1.151E 03	4.119E 01	2.194E-02	2.976E 01	1.585E-02
3.981E 01	1.711E 01	0.000	-5.670E 02	0.000	0.000	0.000	1.181E 03	4.312E 01	2.596E-02	1.178E 01	6.273E-03
4.000E 01	1.752E 01	0.000	-5.860E 02	0.000	0.000	0.000	1.205E 03	4.433E 01	2.761E-02	9.129E 00	3.329E-03
4.032E 01	1.925E 01	0.000	-6.197E 02	0.000	0.000	0.000	1.248E 03	4.858E 01	2.587E-02	2.330E 00	1.241E-03
4.040E 01	1.972E 01	0.000	-6.304E 02	0.000	0.000	0.000	1.258E 03	4.968E 01	2.656E-02	3.018E 00	1.607E-03
4.042E 01	1.968E 01	0.000	-6.319E 02	0.000	0.000	0.000	1.257E 03	5.000E 01	2.633E-02	3.092E 00	1.647E-03
4.130E 01	2.475E 01	0.000	-7.541E 02	0.000	0.000	0.000	1.362E 03	6.235E 01	3.521E-02	9.676E 00	5.154E-03
4.137E 01	2.511E 01	0.000	-7.133E 02	0.000	0.000	0.000	1.371E 03	6.385E 01	3.369E-02	1.016E 01	5.409E-03
4.150E 01	2.584E 01	0.000	-7.560E 02	0.000	0.000	0.000	1.386E 03	6.510E 01	3.467E-02	1.116E 01	5.904E-03
4.246E 01	3.312E 01	0.000	-8.157E 02	0.000	0.000	0.000	1.595E 02	3.332E 01	1.806E-02	1.842E 01	9.813E-03
4.409E 01	1.712E 01	0.000	-8.408E 02	0.000	0.000	0.000	1.698E 03	3.331E 01	2.307E-02	3.073E 01	1.637E-02
4.431E 01	1.770E 01	0.000	-8.449E 02	0.000	0.000	0.000	1.725E 03	4.400E 01	2.375E-02	2.994E 01	1.595E-02
4.480E 01	1.882E 01	0.000	-8.564E 02	0.000	0.000	0.000	1.755E 03	4.735E 01	2.526E-02	2.821E 01	1.502E-02
4.480E 01	1.882E 01	0.000	-8.564E 02	0.000	0.000	0.000	1.755E 03	4.735E 01	2.526E-02	2.820E 01	1.502E-02
4.626E 01	1.717E 01	0.000	-8.771E 02	0.000	0.000	0.000	1.964E 03	4.355E 01	2.104E-02	2.305E 01	1.227E-02
4.731E 01	1.597E 01	0.000	-8.810E 02	0.000	0.000	0.000	2.095E 03	4.035E 01	2.144E-02	1.933E 01	1.030E-02
4.733E 01	1.586E 01	0.000	-8.799E 02	0.000	0.000	0.000	2.097E 03	3.995E 01	2.128E-02	1.927E 01	1.027E-02
4.811E 01	1.035E 01	0.000	-1.059E 03	0.000	0.000	0.000	2.194E 03	2.608E 01	1.369E-02	2.324E 01	1.238E-02
4.878E 01	1.037E 01	0.000	-8.766E 02	0.000	0.000	0.000	2.278E 03	2.682E 01	1.418E-02	2.662E 01	1.418E-02
4.931E 01	1.163E 01	0.000	-1.118E 03	0.000	0.000	0.000	2.278E 03	2.682E 01	1.418E-02	2.662E 01	1.418E-02
5.072E 01	4.725E 00	0.000	-7.452E 02	0.000	0.000	0.000	2.522E 03	2.931E 01	1.561E-02	2.931E 01	1.561E-02
5.282E 01	6.225E 00	0.000	-6.849E 02	0.000	0.000	0.000	2.788E 03	1.568E 01	6.353E-03	1.568E 01	6.353E-03
5.332E 01	5.871E 00	0.000	-6.692E 02	0.000	0.000	0.000	2.852E 03	1.479E 01	7.878E-03	1.479E 01	7.878E-03
5.403E 01	5.227E 00	0.000	-6.877E 02	0.000	0.000	0.000	2.948E 03	1.317E 01	7.014E-03	1.317E 01	7.014E-03
5.483E 01	4.575E 00	0.000	-6.287E 02	0.000	0.000	0.000	3.055E 03	1.153E 01	6.139E-03	1.153E 01	6.139E-03
5.576E 01	3.744E 00	0.000	-6.093E 02	0.000	0.000	0.000	3.185E 03	9.944E 00	5.024E-03	9.944E 00	5.024E-03
5.625E 01	3.307E 00	0.000	-5.777E 02	0.000	0.000	0.000	3.205E 03	8.331E 00	4.437E-03	8.331E 00	4.437E-03
5.631E 01	1.388E 00	0.000	-5.768E 02	0.000	0.000	0.000	3.216E 03	3.466E 00	1.662E-03	6.207E 00	4.371E-03
5.645E 01	1.381E 00	0.000	-5.747E 02	0.000	0.000	0.000	3.245E 03	3.466E 00	1.662E-03	7.893E 00	4.204E-03
5.653E 01	3.062E 00	0.000	-5.734E 02	0.000	0.000	0.000	3.245E 03	7.714E 00	4.108E-03	7.714E 00	4.108E-03
5.681E 01	2.812E 00	0.000	-5.696E 02	0.000	0.000	0.000	3.280E 03	7.086E 00	3.774E-03	7.086E 00	3.774E-03
5.703E 01	2.726E 00	0.000	-5.669E 02	0.000	0.000	0.000	3.309E 03	6.869E 00	3.658E-03	6.869E 00	3.658E-03
5.776E 01	2.450E 00	0.000	-5.599E 02	0.000	0.000	0.000	3.402E 03	6.173E 00	3.287E-03	6.173E 00	3.287E-03
5.878E 01	3.412E 00	0.000	-5.531E 02	0.000	0.000	0.000	3.532E 03	5.598E 00	4.579E-03	5.598E 00	4.579E-03
6.079E 01	2.250E 00	0.000	-5.524E 02	0.000	0.000	0.000	3.790E 03	5.669E 00	3.019E-03	5.669E 00	3.019E-03
6.221E 01	1.550E 00	0.000	-5.524E 02	0.000	0.000	0.000	3.912E 03	3.905E 00	2.080E-03	3.905E 00	2.080E-03
6.467E 01	3.470E 00	0.000	-5.524E 02	0.000	0.000	0.000	4.289E 03	6.743E 00	4.656E-03	6.743E 00	4.656E-03
6.505E 01	4.533E 00	0.000	-5.524E 02	0.000	0.000	0.000	4.337E 03	1.143E 01	6.089E-03	9.481E 00	5.049E-03



XAB8	P=18	P=08	P=0A	BOX	U=18	G=08	CANALL	P=18/P50	P=18/P10	P=08/P50	P=08/P10
6.509E 01	4.537E 00	3.794E 00	-5.524E 02	-1.769E 03	-7.652E 02	-1.024E 03	4.342E 03	1.143E 01	6.069E-03	9.559E 00	P=08/P10
6.529E 01	4.247E 00	3.950E 00	-5.524E 02	-1.744E 03	-7.667E 02	-1.027E 03	4.346E 03	1.070E 01	5.699E-03	9.559E 00	5.091E-03
6.695E 01	1.840E 00	2.350E 00	-5.178E 02	-1.829E 03	-7.776E 02	-1.051E 03	4.563E 03	4.536E 00	2.669E-03	9.552E 00	5.300E-03
6.762E 01	1.849E 00	2.745E 00	-4.735E 02	-1.859E 03	-7.811E 02	-1.058E 03	4.625E 03	4.659E 00	2.461E-03	5.921E 00	3.153E-03
6.839E 01	1.860E 00	2.448E 00	-4.130E 02	-1.852E 03	-7.846E 02	-1.063E 03	4.760E 03	4.666E 00	2.496E-03	6.916E 00	3.603E-03
6.911E 01	1.608E 00	2.170E 00	-3.611E 02	-1.866E 03	-7.875E 02	-1.070E 03	4.846E 03	4.922E 00	2.158E-03	6.167E 00	3.285E-03
6.972E 01	1.395E 00	1.945E 00	-3.329E 02	-1.870E 03	-7.895E 02	-1.080E 03	4.922E 03	3.515E 00	1.672E-03	5.467E 00	2.912E-03
7.067E 01	1.222E 00	1.595E 00	-2.744E 02	-1.847E 03	-7.424E 02	-1.103E 03	5.036E 03	3.090E 00	1.646E-03	4.901E 00	2.610E-03
7.110E 01	1.150E 00	1.526E 00	-2.551E 02	-1.906E 03	-7.935E 02	-1.112E 03	5.088E 03	2.897E 00	1.543E-03	4.019E 00	2.140E-03
7.263E 01	1.009E 00	1.332E 00	-1.960E 02	-1.929E 03	-7.970E 02	-1.132E 03	5.273E 03	2.542E 00	1.354E-03	3.869E 00	2.061E-03
7.278E 01	9.980E-01	1.131E 00	-1.911E 02	-1.930E 03	-7.973E 02	-1.133E 03	5.280E 03	2.507E 00	1.335E-03	3.134E 00	1.778E-03
7.353E 01	8.348E-01	3.400E-01	-1.635E 02	-1.940E 03	-7.987E 02	-1.141E 03	5.374E 03	2.103E 00	1.120E-03	2.925E 00	1.598E-03
7.485E 01	5.505E-01	0.000	-1.483E 02	-1.960E 03	-8.007E 02	-1.150E 03	5.475E 03	2.100E 00	1.119E-03	8.456E-01	4.504E-04
7.771E 01	8.400E-01	0.000	-1.205E 02	-1.963E 03	-8.041E 02	-1.159E 03	5.525E 03	1.386E 00	7.360E-04	0.000	0.000
8.161E 01	8.750E-01	0.000	-8.381E 01	-1.966E 03	-8.070E 02	-1.159E 03	5.630E 03	2.116E 00	1.127E-03	0.000	0.000
8.442E 01	8.800E-01	0.000	-6.376E 01	-1.968E 03	-8.093E 02	-1.159E 03	5.682E 03	2.205E 00	1.174E-03	0.000	0.000
8.728E-01	8.209E-01	0.000	-5.548E 01	-1.973E 03	-8.135E 02	-1.159E 03	5.707E 03	1.809E 00	8.441E-04	0.000	0.000
8.728E 01	6.203E-01	0.000	-5.548E 01	-1.973E 03	-8.135E 02	-1.159E 03	5.707E 03	1.563E 00	8.323E-04	0.000	0.000

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0057 BLOCK = 78 TIME = 195.113 MACH 6.0 PT = 745.249 TI = 3048.1

X	UDRAG	CDRAG	CF	HC
4.040E 01	1.111E 02	1.111E 02	2.246E 03	4.410E 02
4.041E 01	1.792E 01	1.113E 02	2.247E 03	4.413E 02
4.130E 01	1.607E 01	1.274E 02	2.378E 03	4.747E 02
4.137E 01	1.182E 00	1.285E 02	2.380E 03	4.769E 02
4.150E 01	2.426E 00	1.310E 02	2.395E 03	4.817E 02
4.246E 01	1.740E 01	1.484E 02	2.462E 03	4.943E 02
4.409E 01	2.898E 01	1.773E 02	2.502E 03	4.967E 02
4.431E 01	3.900E 00	1.812E 02	2.505E 03	4.871E 02
4.480E 01	9.564E 00	1.898E 02	2.525E 03	4.886E 02
4.480E 01	3.560E 02	1.898E 02	2.525E 03	4.890E 02
4.626E 01	2.475E 01	2.146E 02	2.555E 03	4.677E 02
4.731E 01	1.675E 01	2.313E 02	2.572E 03	4.375E 02
4.731E 01	2.634E 01	2.316E 02	2.571E 03	4.359E 02
4.811E 01	1.165E 01	2.433E 02	2.566E 03	4.063E 02
4.878E 01	9.265E 00	2.525E 02	2.541E 03	3.691E 02
4.931E 01	6.870E 00	2.594E 02	2.514E 03	3.402E 02
5.072E 01	1.647E 01	2.759E 02	2.465E 03	2.820E 02
5.282E 01	2.073E 01	2.966E 02	2.411E 03	2.243E 02
5.332E 01	4.382E 00	3.010E 02	2.395E 03	2.131E 02
5.407E 01	6.264E 00	3.072E 02	2.375E 03	1.988E 02
5.483E 01	6.006E 00	3.132E 02	2.358E 03	1.861E 02
5.576E 01	6.964E 00	3.202E 02	2.340E 03	1.728E 02
5.625E 01	2.248E 00	3.235E 02	2.292E 03	1.361E 02
5.631E 01	3.172E 01	3.228E 02	2.296E 03	1.356E 02
5.645E 01	7.960E 01	3.236E 02	2.296E 03	1.345E 02
5.653E 01	4.588E 01	3.240E 02	2.295E 03	1.356E 02
5.681E 01	1.602E 00	3.256E 02	2.283E 03	1.347E 02
5.703E 01	1.289E 00	3.269E 02	2.278E 03	1.341E 02
5.776E 01	4.098E 00	3.310E 02	2.270E 03	1.333E 02
5.878E 01	5.703E 00	3.367E 02	2.261E 03	1.299E 02
6.079E 01	1.136E 01	3.481E 02	2.260E 03	1.344E 02
6.221E 01	8.236E 00	3.563E 02	2.255E 03	1.308E 02
6.467E 01	1.412E 01	3.704E 02	2.287E 03	1.327E 02
6.505E 01	2.041E 00	3.725E 02	2.314E 03	1.250E 02
6.509E 01	2.064E 01	3.727E 02	2.322E 03	1.155E 02
6.529E 01	1.006E 00	3.737E 02	2.318E 03	1.170E 02
6.695E 01	6.971E 00	3.807E 02	2.190E 03	7.055E 03
6.762E 01	2.178E 00	3.828E 02	2.205E 03	7.556E 03
6.839E 01	2.543E 00	3.854E 02	2.188E 03	7.183E 03
6.911E 01	2.213E 00	3.876E 02	2.161E 03	6.489E 03
6.972E 01	1.714E 00	3.893E 02	2.136E 03	5.899E 03
7.067E 01	2.406E 00	3.917E 02	2.102E 03	5.175E 03
7.110E 01	1.016E 00	3.927E 02	2.093E 03	4.941E 03
7.263E 01	3.379E 00	3.961E 02	2.066E 03	4.466E 03
7.278E 01	2.933E 01	3.964E 02	2.058E 03	4.201E 03
7.353E 01	1.154E 00	3.976E 02	1.947E 03	2.632E 03
7.353E 01	1.761E 03	3.976E 02	1.946E 03	2.632E 03
7.466E 01	5.505E 01	3.981E 02	1.931E 03	2.496E 03
7.771E 01	1.187E 00	3.993E 02	1.991E 03	3.437E 03
8.161E 01	1.469E 00	4.008E 02	1.985E 03	3.522E 03
8.442E 01	6.355E 01	4.014E 02	1.877E 03	2.209E 03
8.728E 01	2.301E 01	4.016E 02	1.910E 03	2.675E 03
8.728E 01	0.000	4.016E 02	1.909E 03	2.676E 03

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... (LBF) -467.  
 MEASURED THRUST..... (LBF) -490.  
 CALCULATED SPECIFIC IMPULSE..... (LBF-SEC/LBM) -467.  
 MEASURED SPECIFIC IMPULSE..... (LBF-SEC/LBM) -490.  
 CALCULATED THRUST COEFFICIENT..... -1.067  
 MEASURED THRUST COEFFICIENT..... -1.139

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... (LBF) 0.  
 NET THRUST..... (LBF) 0.  
 SPECIFIC IMPULSE..... (LBF-SEC/LBM) 0.  
 THRUST COEFFICIENT..... 0.0000

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... (LBF) 111.1  
 INLET MOMENTUM CHANGE..... (LBF) -742.0  
 COMBUSTOR FRICTION DRAG..... (LBF) 261.4  
 COMBUSTOR STRUT DRAG..... (LBF) 9.33  
 COMBUSTOR MOMENTUM CHANGE..... (LBF) -192.  
 NOZZLE FRICTION DRAG..... (LBF) 29.15  
 NOZZLE STRUT DRAG..... (LBF) 0.00  
 NOZZLE MOMENTUM CHANGE..... (LBF) 468.  
 NOZZLE PRESSURE INTEGRAL..... (LBF) 497.  
 EXTERNAL FRICTION DRAG..... (LBF) 43.93  
 EXTERNAL PRESSURE INTEGRAL..... (LBF) -1047.  
 TOTAL EXTERNAL DRAG..... (LBF) -1091.  
 TOTAL STRUT DRAG..... (LBF) 9.33  
 CAVITY FORCE..... (LBF) -983.  
 CALCULATED LOAD CELL FORCE..... -2541.  
 MEASURED LOAD CELL FORCE..... -2564.  
 FUEL VACUUM SPECIFIC IMPULSE

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9811  
 ADDITIVE DRAG COEFFICIENT..... 0.0009  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1632  
 DELTA P12..... (PSI) 0.1189  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3860  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1653  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.9909  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9032  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9436  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8936  
 ENTHALPY AT P0 = SUPERSONIC..... 0.66 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 36.38 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0000  
 EQUIVALENCE RATIO..... 0.000  
 COMBUSTOR EFFICIENCY..... 0.000  
 TOTAL PRESSURE RATIO..... 0.2406  
 COMBUSTOR EFFECTIVENESS..... 0.6582  
 INJECTOR DISCHARGE COEFFICIENTS

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C0..... 0.9955  
 NOZZLE COEFFICIENT = C1..... 0.9522  
 PROCESS EFFICIENCY..... 1.0089  
 KINETIC ENERGY EFFICIENCY..... 0.9907

## STATIONS

NOMINAL COOL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3069 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COOL LEADING EDGE..... 39.191 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.531 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.283 (IN)  
 STRUT LEADING EDGE..... 56.447 (IN)  
 STRUT TRAILING EDGE..... 65.047 (IN)  
 COMBUSTOR EXIT..... 65.047 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.292	
1C	44.300	
2A	48.767	
2C	46.250	
3A	54.057	
3B	56.242	
4	44.742	

Reading 57

$t = 207,71 \text{ sec.}$

READING = 0057 BLOCK = 92 TIME = 207.713 MACH 6.0 PI = 743.999 TT = 3062.1  
RAJNET PERFORMANCE

3-4-75

S U M M A R Y R E P O R T

	P	T	M	S	MACH	VEL	S	M/A	M	A/C	MUTH	O	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5												
0.000	743.999	3062	688.3( 813)	1.2908	28.966	2805									
0.000	0.399	421	-27.0( 101)	1.3990	28.965	1006	5.952	5986	1.834	0.10624	26.608	0.9778	5050	9.884	189.8
SPIKE TIP N8	2	0	3												
0.600	17.875	3062	688.3( 813)	1.2906	28.965	2804									
0.600	16.060	2989	688.1( 791)	1.2929	28.965	2578	0.410	1055	2.089	0.10624	26.608	0.9778	4894	1.742	183.9
WIND TUNNEL	3	0	0												
0.000	743.999	3062	688.3( 813)	1.2908	28.966	2805									
0.000	0.377	415	-28.4( 99)	1.3990	28.965	998	6.007	5993	1.834	0.10221	25.597	0.9778	4882	9.818	190.0
SPIKE TIP N8	4	0	0												
0.600	17.875	3062	688.3( 813)	1.2906	28.965	2804									
0.600	16.214	2995	688.0( 793)	1.2927	28.965	2578	0.391	1007	2.089	0.10221	25.597	0.9778	4862	1.600	190.0
INLET THROAT	5	0	4												
40.400	267.373	3009	678.0( 797)	1.2925	28.966	2583									
40.400	16.066	1495	240.9( 370)	1.3482	28.965	1860	2.497	4645	1.894	0.93721	26.608	0.1108	4298	67.653	161.8
INLET UPN8K	6	0	3												
40.400	287.373	3009	672.0( 797)	1.2925	28.966	2583									
40.400	13.824	1437	225.6( 354)	1.3514	28.965	1826	2.588	4727	1.894	0.85201	26.608	0.1219	4341	62.585	163.1
INLET DN8K	7	0	4												
40.400	123.814	3009	678.0( 797)	1.2925	28.966	2583									
40.400	108.995	2906	641.0( 767)	1.2957	28.966	2542	0.490	1246	1.932	0.88201	26.608	0.1219	4341	16.499	163.1
COMBUSTOR	8	0	21												
40.410	239.209	2961	673.3( 819)	1.2951	27.638	2627									
40.410	12.777	1447	224.4( 374)	1.3522	27.638	1876	2.526	4739	1.978	0.94062	26.794	0.1109	4297	69.276	160.9
COMBUSTOR	9	0	21												
41.322	176.046	2885	674.1( 826)	1.2992	26.556	2649									
41.322	20.585	1712	310.9( 466)	1.3403	26.556	2073	2.057	4263	2.055	0.94507	26.794	0.1107	4138	62.618	154.3
COMBUSTOR	10	0	21												
41.332	183.162	2846	674.1( 814)	1.3010	26.515	2635									
41.332	20.670	1672	311.6( 454)	1.3426	26.515	2052	2.075	4259	2.049	0.94536	26.794	0.1107	4132	62.565	154.2
COMBUSTOR	11	0	21												
41.397	180.974	2839	673.7( 812)	1.3013	26.509	2632									
41.397	21.227	1684	317.0( 458)	1.3421	26.509	2059	2.052	4225	2.049	0.94580	26.794	0.1106	4120	62.100	153.8
COMBUSTOR	12	0	21												
41.500	176.261	2836	673.2( 811)	1.3015	26.508	2631									
41.500	22.670	1722	328.5( 469)	1.3404	26.508	2081	1.996	4153	2.050	0.94661	26.794	0.1105	4100	61.091	153.0
COMBUSTOR	13	0	3												
42.460	142.614	2870	666.8( 821)	1.2995	26.595	2642									
42.460	27.565	1935	374.5( 532)	1.3313	26.595	2196	1.742	3824	2.069	0.93678	26.794	0.1117	3973	55.674	148.3
COMBUSTOR	14	0	5												
44.117	106.971	3269	653.0( 942)	1.2800	27.047	2773									
44.117	45.730	2701	467.0( 761)	1.2992	27.049	2540	1.201	3050	2.119	0.90395	26.794	0.1157	3896	42.649	145.4
COMBUSTOR	15	0	3												
44.310	105.999	3277	651.2( 944)	1.2795	27.062	2776									
44.310	47.079	2732	478.5( 770)	1.2980	27.064	2552	1.172	2990	2.120	0.90240	26.794	0.1159	3888	41.933	145.1
COMBUSTOR	16	0	3												
44.800	104.016	3281	646.3( 945)	1.2791	27.084	2776									
44.800	50.499	2793	485.5( 769)	1.2957	27.086	2577	1.100	2836	2.121	0.89892	26.794	0.1164	3867	39.619	144.3
COMBUSTOR	17	0	10												
44.832	103.944	3280	645.9( 945)	1.2792	27.084	2775									
44.832	50.593	2793	488.8( 769)	1.2957	27.086	2577	1.098	2831	2.121	0.89876	26.794	0.1164	3866	39.542	144.3
COMBUSTOR	18	0	11												
46.250	97.155	2826	653.8( 904)	1.3027	23.552	2782									
46.250	54.607	2469	526.7( 779)	1.3146	23.552	2612	0.966	2523	2.298	0.85709	27.090	0.1234	3656	33.600	142.3

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	W/A	W	A/VAC	MUPTH	Q	IVAC	PMI	ETAC
COMBUSTOR	0	19	12	2												
46.260	97.105	2627	653.7	( 905)	1.3026	23.654	2782									
46.260	54.636	2471	526.7	( 779)	1.3145	23.654	2613	0.965	2521	2.299	0.85639	27.090	0.1235	3857	33.553	142.4 0.55 0.10
COMBUSTOR	0	20	13	4												
47.210	93.852	2993	641.4	( 940)	1.2945	23.843	2842									
47.210	57.956	2678	527.6	( 849)	1.3050	23.844	2700	0.884	2386	2.315	0.79687	27.090	0.1327	3980	29.553	146.9 0.55 0.16
COMBUSTOR	0	21	14	2												
47.357	93.770	2999	640.8	( 942)	1.2942	23.850	2844									
47.357	58.116	2686	527.6	( 851)	1.3046	23.851	2703	0.881	2380	2.316	0.79474	27.090	0.1331	3985	29.395	147.1 0.55 0.16
COMBUSTOR	0	22	15	4												
48.110	90.059	3226	632.5	(1039)	1.2830	24.095	2922									
48.110	54.071	2877	504.2	( 915)	1.2949	24.096	2773	0.914	2533	2.337	0.79238	27.090	0.1425	4106	29.229	151.4 0.55 0.20
COMBUSTOR	0	23	16	6												
48.797	84.410	2913	641.8	(1049)	1.2999	21.091	2988									
48.797	42.441	2478	467.4	( 877)	1.3146	21.091	2771	1.066	2953	2.549	0.69032	27.441	0.1552	4206	31.685	153.3 0.94 0.15
COMBUSTOR	0	24	17	2												
48.807	84.356	2916	641.7	(1050)	1.2998	21.093	2989									
48.807	42.322	2479	466.7	( 877)	1.3148	21.093	2772	1.068	2959	2.550	0.68942	27.441	0.1554	4208	31.702	153.4 0.94 0.15
COMBUSTOR	0	25	18	4												
49.337	81.912	3020	637.0	(1090)	1.2947	21.191	3029									
49.337	35.983	2493	424.6	( 881)	1.3126	21.192	2771	1.176	3258	2.562	0.68477	27.441	0.1662	4310	32.646	157.1 0.94 0.18
COMBUSTOR	0	26	19	5												
50.747	73.933	3387	625.7	(1231)	1.2765	21.937	3159									
50.747	32.206	2815	388.4	(1000)	1.2965	21.540	2902	1.187	3445	2.602	0.54952	27.441	0.1950	4547	29.423	165.7 0.94 0.28
COMBUSTOR	0	27	20	4												
52.847	68.139	3654	611.4	(1334)	1.2616	21.818	3242									
52.847	22.837	2885	286.6	(1022)	1.2899	21.823	2912	1.384	4030	2.627	0.45040	27.441	0.2379	4828	28.205	175.9 0.94 0.36
COMBUSTOR	0	28	21	3												
53.347	67.326	3682	608.3	(1349)	1.2600	21.847	3249									
53.347	21.092	2866	263.9	(1014)	1.2901	21.857	2900	1.431	4151	2.629	0.43199	27.441	0.2480	4880	27.867	177.8 0.94 0.37
COMBUSTOR	0	29	22	4												
54.097	65.947	3728	603.9	(1363)	1.2571	21.900	3262									
54.097	19.109	2858	235.3	(1009)	1.2896	21.913	2892	1.485	4296	2.634	0.40721	27.441	0.2631	4950	27.175	180.4 0.94 0.39
COMBUSTOR	0	30	23	3												
54.857	65.294	3740	599.6	(1367)	1.2563	21.921	3264									
54.857	17.100	2804	204.1	( 987)	1.2912	21.934	2865	1.553	4449	2.635	0.38508	27.441	0.2782	5015	26.633	182.7 0.94 0.39
COMBUSTOR	0	31	24	4												
55.760	63.580	3792	594.9	(1387)	1.2530	21.981	3278									
55.760	15.680	2812	179.2	( 989)	1.2901	21.997	2863	1.593	4561	2.640	0.36208	27.441	0.2959	5078	25.664	185.1 0.94 0.41
COMBUSTOR	0	32	25	5												
56.282	69.910	4223	592.3	(1597)	1.2228	22.415	3384									
56.282	14.860	3339	167.5	(1191)	1.2632	22.470	3055	1.473	4501	2.665	0.29128	27.441	0.3678	5239	20.373	190.9 0.94 0.54
COMBUSTOR	0	33	26	5												
56.337	58.196	3826	592.1	(1401)	1.2505	22.021	3287									
56.337	11.118	2683	109.4	( 938)	1.2940	22.039	2799	1.756	4915	2.650	0.29041	27.441	0.3689	5242	22.181	191.0 0.94 0.42
COMBUSTOR	0	34	27	3												
56.477	58.049	3833	591.5	(1403)	1.2500	22.029	3288									
56.477	11.008	2685	106.2	( 938)	1.2938	22.047	2799	1.761	4926	2.650	0.28827	27.441	0.3717	5251	22.076	191.3 0.94 0.42
COMBUSTOR	0	35	28	6												
56.557	50.895	4204	591.1	(1550)	1.2243	22.399	3380									
56.557	14.428	3286	173.7	(1170)	1.2657	22.451	3035	1.506	4570	2.642	0.29155	27.441	0.3675	5256	20.708	191.5 0.94 0.53
COMBUSTOR	0	36	29	3												
56.837	51.681	4167	589.8	(1543)	1.2257	22.384	3376									
56.837	13.987	3237	160.7	(1150)	1.2680	22.434	3016	1.536	4634	2.680	0.29069	27.441	0.3686	5273	20.933	192.1 0.94 0.53
COMBUSTOR	0	37	30	4												
57.063	52.685	4152	588.8	(1529)	1.2283	22.351	3368									
57.063	13.473	3165	147.1	(1122)	1.2714	22.397	2989	1.573	4702	2.676	0.29009	27.441	0.3693	5284	21.196	192.6 0.94 0.52

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/C	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4													
57.767	55.842	4025	505	71(1479)	1.2374	22.231	3336										
57.767	11.025	2923	106	3(1028)	1.2824	22.264	2693	1.695	4898	0.28549	27.441	0.3753	5314	21.730	193.6	0.94	0.08
COMBUSTOR	0	39	32	6													
58.607	101.022	3228	328	502.0(1167)	1.2833	21.480	3096										
58.607	6.037	1546	16	1( 585)	1.3418	21.490	2260	2.460	5561	0.28367	27.441	0.3777	5327	24.817	194.1	0.94	0.27
COMBUSTOR	0	40	33	6													
60.817	48.784	4545	575	4(1684)	1.1970	22.791	3445										
60.817	17.450	3808	202	1(1373)	1.2311	22.907	3194	1.353	4322	0.29354	27.441	0.3650	5317	19.716	193.8	0.94	0.66
COMBUSTOR	0	41	34	4													
62.237	51.007	4892	570	4(1647)	1.2049	22.705	3427										
62.237	16.884	3649	178	7(1310)	1.2843	22.799	3147	1.407	4427	0.30150	27.441	0.3553	5309	20.743	193.5	0.94	0.63
COMBUSTOR	0	42	35	5													
64.701	44.920	4778	560	8(1776)	1.1758	23.075	3479										
64.701	21.549	4287	275	1(1566)	1.1985	23.237	3316	1.140	3781	0.28579	27.441	0.3749	5294	16.792	192.9	0.94	0.76
COMBUSTOR	0	43	36	4													
65.077	41.461	4823	599	2(1794)	1.1704	23.120	3483										
65.077	21.071	402	303	0(1613)	1.1886	23.294	3342	1.071	3580	0.28569	27.441	0.4032	5292	14.783	192.8	0.94	0.79
COMBUSTOR	44	37	21														
65.077	41.461	4933	644	7(1843)	1.1641	23.042	3520										
65.077	22.890	4559	402	5(1680)	1.1779	23.222	3391	1.027	3481	0.28569	27.441	0.4032	5334	14.375	194.4	0.94	0.79
NOZZLE	46	38	5														
87.313	41.461	4823	599	2(1797)	1.1704	23.120	3483										
87.313	1.284	2562	550	6( 864)	1.2803	23.461	2636	2.801	7385	0.05531	27.441	1.9371	6925	6.347	282.4	0.94	0.79
NOZZLE	46	39	5														
87.313	41.461	4923	599	2(1797)	1.1704	23.120	3483										
87.313	0.399	1974	751	2( 644)	1.3035	23.461	2335	3.468	8097	0.02484	27.441	4.3136	7347	3.125	267.7	0.94	0.79
NOZZLE	46	40	5														
87.313	41.461	4933	644	7(1843)	1.1641	23.042	3520										
87.313	1.358	2782	475	6( 918)	1.2750	23.460	2702	2.771	7487	0.05531	27.441	1.9371	7038	6.436	256.8	0.94	0.79
NOZZLE	46	41	5														
87.313	41.461	4933	644	7(1843)	1.1641	23.042	3520										
87.313	0.399	2071	715	7( 680)	1.2993	23.461	2388	3.455	8251	0.02412	27.441	4.4412	7491	3.003	273.0	0.94	0.79
PICITIVE	COMBUSTOR	66	61	0													
65.077	287.373	5409	559	2(2031)	1.1607	23.750	3625										
65.077	0.399	1574	1336	7( 491)	1.3141	24.386	2054	4.616	9480	0.03789	27.441	2.8273	8374	5.583	308.2	0.94	1.00
PICITIVE	NOZZLE	69	62	0													
87.313	25.141	4746	532	8(1762)	1.1688	23.110	3492										
87.313	1.605	2963	371	5(1020)	1.2686	23.458	2818	2.387	6727	0.05531	27.441	1.9371	6534	5.782	238.1	0.94	0.79

READING = 0.057 BLOCK = 92 TIME = 207.713 MACH 6.0 PI = 743.999 TI = 3062.1										PAGE 0									
XAB8	P-IR	P-OB	PDA	DOX	W-IR	O-OB	CAMALL	P-IR/PSU	F-1B/PIU	P-OB/PSU	P-OB/PIU								
6.981E-01	1.035E 00	0.000	4.361E-01	0.000	0.000	0.000	2.470E-02	2.648E 00	1.018E-03	0.000	0.000								
1.036E 01	1.055E 00	0.000	3.512E 01	0.000	0.000	0.000	1.634E 02	2.648E 00	1.418E-03	0.000	0.000								
1.070E 01	2.205E 00	0.000	1.673E 02	0.000	0.000	0.000	5.053E 02	5.528E 00	2.964E-03	0.000	0.000								
3.070E 01	3.951E 00	0.000	3.669E 02	0.000	0.000	0.000	6.804E 02	9.922E 00	5.218E-03	0.000	0.000								
3.521E 01	3.992E 00	0.000	4.364E 02	0.000	0.000	0.000	6.866E 02	1.001E 01	5.366E-03	1.483E 01	7.947E-03								
3.522E 01	3.998E 00	0.000	4.364E 02	0.000	0.000	0.000	6.866E 02	1.001E 01	5.366E-03	1.473E 01	7.898E-03								
3.555E 01	4.080E 00	0.000	4.337E 02	0.000	0.000	0.000	7.196E 02	1.023E 01	5.484E-03	9.494E 00	9.089E-03								
3.509E 01	4.004E 00	0.000	4.606E 02	2.550E 02	2.550E 02	0.000	7.595E 02	1.004E 01	5.362E-03	4.136E 00	2.218E-03								
3.606E 01	3.985E 00	0.000	4.708E 02	2.575E 02	2.575E 02	0.000	7.716E 02	9.949E 00	5.329E-03	5.600E 00	3.106E-03								
3.648E 01	4.222E 00	0.000	4.926E 02	2.638E 02	2.638E 02	0.000	8.152E 02	1.059E 01	5.675E-03	9.631E 00	5.269E-03								
3.701E 01	4.245E 00	0.000	5.143E 02	2.859E 02	2.859E 02	0.000	8.713E 02	1.054E 01	5.706E-03	1.492E 01	7.995E-03								
3.735E 01	4.082E 00	0.000	5.331E 02	2.964E 02	2.964E 02	0.000	9.078E 02	1.019E 01	5.464E-03	1.615E 01	9.728E-03								
3.803E 01	3.700E 00	0.000	5.481E 02	2.974E 02	2.974E 02	0.000	9.621E 02	9.274E 00	4.973E-03	3.144E 01	1.685E-02								
3.837E 01	3.617E 00	0.000	5.155E 02	3.249E 02	3.249E 02	0.000	1.020E 03	1.230E 01	6.945E-03	3.797E 01	2.035E-02								
3.875E 01	6.017E 00	0.000	5.459E 02	3.441E 02	3.441E 02	0.000	1.063E 03	1.174E 01	9.190E-03	3.717E 01	1.992E-02								
3.904E 01	7.255E 00	0.000	5.459E 02	3.441E 02	3.441E 02	0.000	1.073E 03	1.098E 01	9.980E-03	3.699E 01	1.983E-02								
3.901E 01	7.374E 00	0.000	5.449E 02	3.552E 02	3.552E 02	0.000	1.093E 03	1.099E 01	1.071E-02	3.904E 01	2.041E-02								
3.930E 01	1.304E 01	0.000	5.500E 02	3.711E 02	3.711E 02	0.000	1.131E 03	1.039E 01	1.073E-02	4.022E 01	2.398E-02								
3.950E 01	1.565E 01	0.000	5.564E 02	3.742E 02	3.742E 02	0.000	1.142E 03	1.039E 01	1.238E-02	4.222E 01	1.729E-02								
3.954E 01	1.755E 01	0.000	5.605E 02	3.877E 02	3.877E 02	0.000	1.180E 03	1.039E 01	2.334E-02	1.479E 01	7.930E-03								
4.004E 01	1.799E 01	0.000	5.960E 02	4.077E 02	4.077E 02	0.000	1.180E 03	1.039E 01	2.334E-02	1.479E 01	7.930E-03								
4.004E 01	2.271E 01	0.000	5.960E 02	4.077E 02	4.077E 02	0.000	1.207E 03	1.039E 01	2.411E-02	1.121E 01	6.010E-03								
4.040E 01	2.353E 01	0.000	6.337E 02	4.288E 02	4.288E 02	0.000	1.247E 03	1.039E 01	3.061E-02	3.622E 00	2.284E-03								
4.040E 01	2.353E 01	0.000	6.337E 02	4.288E 02	4.288E 02	0.000	1.254E 03	1.039E 01	3.203E-02	4.332E 00	2.323E-03								
4.132E 01</																			



XASB	P-18	P-08	PDA	COX	U-18	U-08	CANALL	P-18/P80	P-18/P10	P-08/P80	P-08/P10
6.224E 01	1.684E 01	1.684E 01	6.933E 02	-4.434E 03	-1.928E 03	-2.506E 03	3.972E 03	4.224E 01	2.264E-02	4.224E 01	2.264E-02
6.470E 01	2.155E 01	6.933E 02	-4.697E 03	-2.010E 03	-2.647E 03	4.280E 03	4.280E 03	5.404E 01	2.896E-02	5.404E 01	2.896E-02
6.508E 01	2.107E 01	6.933E 02	-4.741E 03	-2.024E 03	-2.717E 03	4.337E 03	4.337E 03	5.259E 01	2.833E-02	5.259E 01	2.833E-02
6.512E 01	2.234E 01	6.933E 02	-4.746E 03	-2.026E 03	-2.720E 03	4.342E 03	4.342E 03	5.285E 01	2.833E-02	5.285E 01	2.833E-02
6.532E 01	2.032E 01	6.933E 02	-4.769E 03	-2.033E 03	-2.736E 03	4.366E 03	4.366E 03	5.023E 01	2.622E-02	5.023E 01	2.622E-02
6.596E 01	2.272E 01	6.933E 02	-4.769E 03	-2.033E 03	-2.736E 03	4.366E 03	4.366E 03	5.023E 01	2.622E-02	5.023E 01	2.622E-02
6.745E 01	1.117E 01	8.709E 02	-4.933E 03	-2.086E 03	-2.847E 03	4.583E 03	4.583E 03	2.831E 01	1.528E-02	2.831E 01	1.528E-02
6.842E 01	0.159E 00	1.066E 03	-4.987E 03	-2.102E 03	-2.885E 03	4.665E 03	4.665E 03	2.036E 01	1.102E-02	2.036E 01	1.102E-02
6.842E 01	4.555E 00	1.267E 03	-5.047E 03	-2.117E 03	-2.930E 03	4.750E 03	4.750E 03	1.122E 01	6.122E-03	1.807E 01	9.085E-03
6.914E 01	3.686E 00	1.397E 03	-5.105E 03	-2.129E 03	-2.977E 03	4.846E 03	4.846E 03	9.046E 00	4.846E-03	1.279E 01	6.055E-03
6.975E 01	5.100E 00	1.481E 03	-5.153E 03	-2.136E 03	-3.017E 03	4.928E 03	4.928E 03	7.034E 00	3.770E-03	1.068E 01	5.725E-03
7.070E 01	2.013E 00	1.575E 03	-5.220E 03	-2.145E 03	-3.072E 03	5.036E 03	5.036E 03	5.049E 00	2.706E-03	7.397E 00	3.965E-03
7.113E 01	1.655E 00	1.607E 03	-5.247E 03	-2.148E 03	-3.098E 03	5.085E 03	5.085E 03	4.150E 00	2.224E-03	6.231E 00	3.661E-03
7.262E 01	1.109E 00	1.693E 03	-5.317E 03	-2.158E 03	-3.159E 03	5.275E 03	5.275E 03	2.780E 00	1.490E-03	4.815E 00	2.581E-03
7.281E 01	1.052E 00	1.699E 03	-5.322E 03	-2.159E 03	-3.163E 03	5.290E 03	5.290E 03	2.646E 00	1.418E-03	4.275E 00	2.592E-03
7.354E 01	1.136E 00	1.738E 03	-5.351E 03	-2.163E 03	-3.188E 03	5.374E 03	5.374E 03	2.849E 00	1.527E-03	1.580E 00	8.468E-04
7.354E 01	1.137E 00	1.739E 03	-5.351E 03	-2.163E 03	-3.188E 03	5.375E 03	5.375E 03	2.850E 00	1.528E-03	1.580E 00	8.468E-04
7.480E 01	1.200E 00	1.765E 03	-5.409E 03	-2.170E 03	-3.239E 03	5.426E 03	5.426E 03	3.210E 00	1.780E-03	1.565E 00	0.000
7.774E 01	2.220E 00	1.835E 03	-5.421E 03	-2.182E 03	-3.239E 03	5.535E 03	5.535E 03	5.507E 00	2.084E-03	0.000	0.000
8.162E 01	1.555E 00	1.916E 03	-5.444E 03	-2.196E 03	-3.239E 03	5.630E 03	5.630E 03	3.899E 00	2.000E-03	0.000	0.000
8.435E 01	1.155E 00	1.946E 03	-5.446E 03	-2.208E 03	-3.239E 03	5.684E 03	5.684E 03	2.971E 00	1.593E-03	0.000	0.000
8.731E 01	1.755E 00	1.981E 03	-5.467E 03	-2.228E 03	-3.239E 03	5.707E 03	5.707E 03	4.401E 00	2.359E-03	0.000	0.000
8.731E 01	1.756E 00	1.981E 03	-5.467E 03	-2.228E 03	-3.239E 03	5.707E 03	5.707E 03	4.402E 00	2.360E-03	0.000	0.000

READING = 0057 BLOCK = 92 TIME = 207.713 MACH 0.0 PI = 743.999 TI = 3062.1

X	DDRAG	CORAG	CF	HC
4.040E 01	1.128E 02	1.128E 02	2.227E-03	4.142E-02
4.041E 01	1.920E-01	1.130E 02	2.522E-03	5.591E-02
4.132E 01	1.848E 01	1.314E 02	2.656E-03	4.935E-02
4.133E 01	1.070E-01	1.316E 02	2.671E-03	5.220E-02
4.140E 01	1.187E 00	1.328E 02	2.691E-03	5.348E-02
4.150E 01	1.865E 00	1.347E 02	2.667E-03	5.359E-02
4.246E 01	1.684E 01	1.515E 02	2.550E-03	6.011E-02
4.412E 01	2.605E 01	1.776E 02	2.722E-03	7.286E-02
4.431E 01	2.817E 00	1.809E 02	2.940E-03	6.766E-02
4.480E 01	7.189E 00	1.876E 02	2.957E-03	6.815E-02
4.483E 01	4.567E-01	1.881E 02	2.966E-03	6.794E-02
4.625E 01	1.996E 01	2.080E 02	3.300E-03	6.295E-02
4.626E 01	1.296E-01	2.082E 02	2.905E-03	7.201E-02
4.731E 01	1.191E 01	2.201E 02	2.892E-03	7.231E-02
4.736E 01	5.003E-01	2.206E 02	2.981E-03	6.989E-02
4.811E 01	8.134E 00	2.287E 02	2.930E-03	6.916E-02
4.880E 01	8.101E 00	2.368E 02	3.280E-03	6.890E-02
4.881E 01	1.224E-01	2.369E 02	2.904E-03	6.678E-02
4.934E 01	6.139E 00	2.431E 02	2.836E-03	6.319E-02
5.075E 01	1.552E 01	2.586E 02	2.798E-03	5.836E-02
5.285E 01	2.156E 01	2.801E 02	2.822E-03	4.645E-02
5.335E 01	5.137E 00	2.853E 02	2.929E-03	4.246E-02
5.410E 01	7.694E 00	2.930E 02	2.908E-03	3.987E-02
5.486E 01	7.598E 00	3.006E 02	2.895E-03	3.701E-02
5.576E 01	8.749E 00	3.093E 02	2.871E-03	3.489E-02
5.628E 01	3.059E 00	3.125E 02	2.849E-03	3.150E-02
5.634E 01	4.392E-01	3.128E 02	3.013E-03	2.519E-02
5.648E 01	1.145E 00	3.140E 02	2.812E-03	2.549E-02
5.656E 01	6.695E-01	3.146E 02	3.303E-03	2.703E-02
5.664E 01	2.341E 00	3.170E 02	3.001E-03	2.891E-02
5.706E 01	1.817E 00	3.188E 02	2.981E-03	2.643E-02
5.779E 01	8.880E 00	3.247E 02	2.934E-03	2.522E-02
5.881E 01	6.746E 00	3.334E 02	2.853E-03	1.732E-02
6.002E 01	1.546E 01	3.486E 02	2.589E-03	3.775E-02
6.224E 01	1.048E 01	3.894E 02	3.118E-03	3.085E-02
6.470E 01	1.862E 01	3.780E 02	3.159E-03	3.232E-02
6.508E 01	2.473E 00	3.804E 02	3.135E-03	3.061E-02
6.512E 01	2.565E-01	3.807E 02	3.266E-03	3.113E-02
6.532E 01	1.304E 00	3.820E 02	3.423E-03	3.103E-02
6.698E 01	1.128E 01	3.933E 02	3.299E-03	2.275E-02
6.769E 01	4.271E 00	3.976E 02	3.275E-03	2.081E-02
6.842E 01	4.509E 00	4.021E 02	3.217E-03	1.591E-02
6.914E 01	3.626E 00	4.057E 02	3.174E-03	1.246E-02
6.975E 01	2.703E 00	4.084E 02	3.146E-03	1.119E-02
7.070E 01	3.613E 00	4.120E 02	3.096E-03	8.664E-03
7.113E 01	1.436E 00	4.134E 02	3.082E-03	7.899E-03
7.268E 01	4.416E 00	4.179E 02	3.032E-03	5.982E-03
7.281E 01	3.579E-01	4.182E 02	3.019E-03	5.573E-03
7.336E 01	1.491E 00	4.197E 02	2.956E-03	3.947E-03
7.356E 01	2.452E-03	4.197E 02	2.955E-03	3.938E-03
7.489E 01	8.890E-01	4.206E 02	2.997E-03	3.241E-03
7.774E 01	2.242E 00	4.228E 02	3.054E-03	7.890E-03
8.164E 01	2.512E 00	4.234E 02	2.987E-03	6.000E-03
8.445E 01	1.072E 00	4.264E 02	2.937E-03	4.853E-03
8.731E 01	4.617E-01	4.269E 02	2.976E-03	6.512E-03
8.731E 01	0.000	4.269E 02	2.976E-03	6.515E-03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST..... 1479. (LBF)  
 MEASURED THRUST..... 1659. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1774. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1991. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5839  
 MEASURED THRUST COEFFICIENT..... 0.6554

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 6640. (LBF)  
 NET THRUST..... 1583. (LBF)  
 SPECIFIC IMPULSE..... 1902. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.6260

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9778  
 ADDITIVE DRAG COEFFICIENT..... 0.0011  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1937  
 DELTA PT2..... 0.1192 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3963  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1660  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8934  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9043  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9373  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8879  
 ENTHALPY AT P0 = SUPERSONIC..... 0.86 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 36.23 (BTU/LBM)

MOMENTUM AND FORCES

COMBUSTOR

INLET FRICTION DRAG..... 112.6 (LBF)  
 INLET MOMENTUM CHANGE..... -757.0 (LBF)  
 COMBUSTOR FRICTION DRAG..... 267.6 (LBF)  
 COMBUSTOR STRUT DRAG..... -12.21 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 993. (LBF)  
 NOZZLE FRICTION DRAG..... 46.54 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1242. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1288. (LBF)  
 EXTERNAL FRICTION DRAG..... 46.90 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1069. (LBF)  
 TOTAL EXTERNAL DRAG..... -1115. (LBF)  
 TOTAL STRUT DRAG..... -12.21 (LBF)  
 CAVITY FORCE..... -1032. (LBF)  
 CALCULATED LOAD CELL FORCE..... -668. (LBF)  
 MEASURED LOAD CELL FORCE..... -487. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0. -159.9. -117.2.

FUEL-AIR RATIO..... 0.0313  
 EQUIVALENCE RATIO..... 0.942  
 COMBUSTOR EFFICIENCY..... 0.785  
 TOTAL PRESSURE RATIO..... 0.1443  
 COMBUSTOR EFFECTIVENESS..... 0.7460  
 INJECTOR DISCHARGE COEFFICIENTS 0.8356, 0.6397, 0.7723, 0.7912

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9434  
 NOZZLE COEFFICIENT = CT..... 0.8623  
 PROCESS EFFICIENCY..... 0.8644  
 KINETIC ENERGY EFFICIENCY..... 0.8724

STATIONS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3268 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.221 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.261 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 67.313 (IN)  
 STRUT LEADING EDGE..... 56.477 (IN)  
 STRUT TRAILING EDGE..... 65.077 (IN)  
 COMBUSTOR EXIT..... 65.077 (IN)

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.322	B
1C	44.300	
2A	48.797	D
2C	46.250	E
3A	54.087	
3B	56.272	
4	44.622	

Reading 57

$t = 234.71 \text{ sec.}$

3-4-75

SUMMARY REPORT

WIND TUNNEL	P	T	H	GAMMA	MOLWT	SONY	MACH	VEL	S	M/A	F	A/C	MUMTH	U	IVAL	PHI	ETAC
0.000	744.249	2981	663.6( 789)	1.2933	28.966	2572	5.908	5900	1.825	0.10574	26.691	0.9855	4992	9.696	187.0		
0.000	0.385	403	-32.1( 97)	1.3988	28.965	980											
SPIKE TIP NS	2	0	5														
0.600	17.637	2981	663.6( 789)	1.2932	28.965	2572											
0.600	16.092	2912	642.8( 768)	1.2954	28.965	2544	0.401	1021	2.081	0.10574	26.691	0.9855	4909	1.677	183.9		
WIND TUNNEL	3	0	0														
0.000	744.249	2981	663.6( 789)	1.2933	28.966	2572											
0.000	0.374	400	-33.0( 96)	1.3988	28.965	980	6.027	5904	1.825	0.10357	26.144	0.9855	4892	9.502	187.1		
SPIKE TIP NS	4	0	0														
0.600	17.637	2981	663.6( 789)	1.2932	28.965	2572											
0.600	16.173	2915	643.8( 769)	1.2953	28.965	2546	0.391	996	2.081	0.10357	26.144	0.9855	4892	1.603	187.1		
INLET THROAT	5	0	2														
40.400	277.035	2922	645.8( 771)	1.2952	28.966	2549											
40.400	16.001	1458	230.9( 360)	1.3503	28.965	1838	2.479	4556	1.887	0.93741	26.691	0.1112	4236	66.378	158.7		
INLET UPNRSK	6	0	3														
40.400	277.035	2922	645.8( 771)	1.2952	28.966	2549											
40.400	13.733	1401	215.9( 345)	1.3536	28.965	1804	2.571	4638	1.887	0.85219	26.691	0.1223	4278	61.424	160.3		
INLET DNRSK	7	0	4														
40.400	121.254	2922	645.8( 771)	1.2952	28.966	2549											
40.400	103.891	2820	615.4( 742)	1.2984	28.966	2507	0.492	1236	1.944	0.85219	26.691	0.1223	4278	16.345	160.3		
COMBUSTOR	8	1	21														
40.410	220.617	2871	650.2( 804)	1.3085	27.171	2612											
40.410	14.699	1478	231.9( 389)	1.3510	27.171	1912	2.394	4576	2.002	0.94214	26.829	0.1112	4234	66.993	157.8	0.16	0.07
COMBUSTOR	9	2	11														
41.308	156.779	2748	656.8( 819)	1.3052	25.477	2646											
41.308	25.604	1766	342.0( 501)	1.3397	25.476	2149	1.847	3969	2.115	0.94882	26.971	0.1110	4055	58.526	150.4	0.32	0.02
COMBUSTOR	10	3	2														
41.318	156.319	2749	656.8( 819)	1.3052	25.476	2646											
41.318	25.726	1770	342.9( 502)	1.3395	25.476	2151	1.842	3963	2.115	0.94959	26.971	0.1109	4053	58.486	150.3	0.32	0.02
COMBUSTOR	11	4	2														
41.363	151.741	2762	656.4( 818)	1.3046	25.492	2651											
41.363	26.816	1807	349.5( 513)	1.3379	25.492	2171	1.805	3918	2.119	0.94857	26.971	0.1110	4039	57.763	149.7	0.32	0.03
COMBUSTOR	12	5	3														
41.500	141.969	2813	655.7( 834)	1.3022	25.545	2670											
41.500	28.915	1916	365.9( 546)	1.3331	25.545	2230	1.708	3808	2.129	0.94989	26.971	0.1109	4013	56.209	148.8	0.32	0.07
COMBUSTOR	13	6	4														
42.460	113.527	2945	648.2( 873)	1.2958	29.704	2717											
42.460	40.513	2312	439.4( 669)	1.3170	25.704	2427	1.331	3231	2.157	0.94152	26.971	0.1118	3869	47.269	143.4	0.32	0.16
COMBUSTOR	14	7	3														
44.103	103.347	2991	631.1( 889)	1.2930	25.804	2730											
44.103	65.388	2693	531.0( 791)	1.3029	25.804	2600	0.861	2239	2.166	0.90769	26.971	0.1160	3820	31.580	141.6	0.32	0.22
COMBUSTOR	15	8	2														
44.310	103.267	2981	628.8( 886)	1.2934	25.801	2726											
44.310	65.792	2688	530.4( 789)	1.3031	25.801	2598	0.854	2219	2.165	0.90681	26.971	0.1161	3817	31.271	141.5	0.32	0.22
COMBUSTOR	16	9	3														
44.800	102.779	2940	623.2( 872)	1.2951	25.775	2710											
44.800	66.748	2662	530.1( 781)	1.3043	25.776	2588	0.834	2180	2.162	0.90324	26.971	0.1166	3803	30.313	141.0	0.32	0.20
COMBUSTOR	17	10	2														
44.818	102.697	2941	623.0( 873)	1.2950	29.776	2710											
44.818	66.610	2661	529.6( 781)	1.3043	25.777	2588	0.836	2163	2.162	0.90286	26.971	0.1166	3803	30.344	141.0	0.32	0.20
COMBUSTOR	18	11	6														
46.250	95.740	2656	628.3( 864)	1.3099	23.067	2739											
46.250	55.556	2331	511.5( 748)	1.3208	23.067	2576	0.938	2417	2.319	0.85982	27.234	0.1237	3806	32.301	139.7	0.61	0.07

READING = 0057 BLOCK = 122 TIME = 234.713 MACH 6.0 PI = 744.249 TI = 2983.6

P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/VAC	MURTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2												
46.260	95.666	2658	628.2( 864)	1.3098	23.088	2739										
46.260	55.478	2332	511.2( 748)	1.3208	23.069	2577	0.939	2419	2.314	0.85908	27.234	0.1238	3806	32.296	139.8	0.61 0.07
COMBUSTOR	0	20	13	4												
47.310	91.360	2820	616.1( 920)	1.3019	23.247	2802										
47.310	47.374	2416	469.4( 775)	1.3156	23.247	2607	1.039	2710	2.339	0.79943	27.234	0.1330	3907	33.663	143.5	0.61 0.14
COMBUSTOR	0	21	14	2												
47.343	91.157	2829	615.8( 923)	1.3015	23.236	2806										
47.343	47.514	2427	469.7( 778)	1.3151	23.256	2612	1.035	2704	2.340	0.79656	27.234	0.1335	3913	33.468	143.7	0.61 0.14
COMBUSTOR	0	22	15	4												
48.110	87.352	2963	607.4( 968)	1.2950	23.402	2855										
48.110	51.199	2619	481.0( 844)	1.3066	23.402	2696	0.933	2516	2.385	0.74485	27.234	0.1428	4001	29.119	146.9	0.61 0.20
COMBUSTOR	0	23	16	6												
48.783	82.056	2755	616.0( 923)	1.3063	21.126	2910										
48.783	41.321	2339	452.0( 820)	1.3205	21.126	2696	1.063	2865	2.522	0.69206	27.510	0.1592	4092	30.812	148.8	0.92 0.13
COMBUSTOR	0	24	17	2												
48.793	81.994	2737	615.9( 988)	1.3062	21.129	2911										
48.793	41.279	2341	451.6( 821)	1.3204	21.129	2697	1.068	2867	2.522	0.69115	27.510	0.1594	4094	30.791	148.8	0.92 0.13
COMBUSTOR	0	25	18	4												
49.323	78.794	2909	611.1(1041)	1.2990	21.266	2972										
49.323	39.042	2467	435.0( 867)	1.3140	21.266	2753	1.078	2968	2.541	0.64639	27.510	0.1662	4199	29.815	152.6	0.92 0.17
COMBUSTOR	0	26	19	5												
50.733	72.016	3233	599.5(1171)	1.2822	21.590	3099										
50.733	32.181	2712	378.8( 936)	1.3009	21.592	2850	1.166	3323	2.579	0.55090	27.510	0.1950	4488	28.448	161.7	0.92 0.26
COMBUSTOR	0	27	20	4												
52.833	65.968	3545	585.0(1283)	1.2667	21.888	3194										
52.833	23.100	2818	282.9( 991)	1.2929	21.895	2876	1.352	3888	2.608	0.45153	27.510	0.2379	4732	27.282	172.0	0.92 0.35
COMBUSTOR	0	28	21	3												
53.333	65.692	3548	581.9(1284)	1.2464	21.998	3194										
53.333	20.808	2758	254.2( 967)	1.2949	21.905	2847	1.422	4049	2.608	0.43307	27.510	0.2480	4784	27.251	173.9	0.92 0.35
COMBUSTOR	0	29	22	4												
54.083	63.668	3626	577.4(1314)	1.2619	21.981	3217										
54.083	19.339	2800	232.7( 982)	1.2922	21.990	2860	1.432	4133	2.615	0.40823	27.510	0.2631	4854	26.146	176.4	0.92 0.38
COMBUSTOR	0	30	23	4												
54.643	62.108	3683	573.1(1336)	1.2585	22.045	3233										
54.643	17.850	2815	209.5( 986)	1.2907	22.056	2862	1.490	4265	2.621	0.38605	27.510	0.2782	4919	25.888	178.8	0.92 0.40
COMBUSTOR	0	31	24	4												
55.760	60.374	3743	568.2(1360)	1.2548	22.115	3250										
55.760	16.356	2831	184.2( 991)	1.2892	22.128	2864	1.531	4384	2.626	0.36266	27.510	0.2962	4989	24.706	181.3	0.92 0.42
COMBUSTOR	0	32	25	5												
56.268	47.613	4179	565.8(1530)	1.2247	22.555	3359										
56.268	15.529	3359	193.3(1192)	1.2621	22.605	3052	1.614	4317	2.671	0.29191	27.510	0.3679	5155	19.584	187.4	0.92 0.55
COMBUSTOR	0	33	26	5												
56.323	54.966	3792	565.5(1379)	1.2514	22.168	3262										
56.323	11.601	2718	114.4( 946)	1.2923	22.185	2806	1.693	4751	2.638	0.29109	27.510	0.3690	5159	21.492	187.5	0.92 0.43
COMBUSTOR	0	34	27	3												
56.463	54.837	3800	564.9(1381)	1.2509	22.177	3264										
56.463	11.487	2720	111.2( 946)	1.2922	22.194	2806	1.698	4765	2.638	0.28900	27.510	0.3717	5168	21.400	187.8	0.92 0.43
COMBUSTOR	0	35	28	6												
56.543	48.693	4164	564.5(1524)	1.2259	22.543	3356										
56.543	15.081	3312	179.4(1173)	1.2644	22.591	3036	1.646	4390	2.668	0.29223	27.510	0.3675	5173	19.935	188.0	0.92 0.54
COMBUSTOR	0	36	29	3												
56.823	49.374	4150	563.3(1519)	1.2271	22.531	3352										
56.823	14.623	3267	166.6(1156)	1.2664	22.577	3018	1.476	4455	2.666	0.29142	27.510	0.3686	5190	20.177	188.7	0.92 0.54
COMBUSTOR	0	37	30	4												
57.049	50.544	4098	562.2(1488)	1.2309	22.480	3340										
57.049	13.890	3166	149.1(1116)	1.2713	22.521	2981	1.525	4547	2.661	0.29077	27.510	0.3694	5202	20.546	189.1	0.92 0.52

READING 8-0037 BLOCK 122 TIME = 234.713 MACH 6.0 PT = 744.249 TT = 2980.6

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/AC	MUMT	G	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4													
57.773	55.071	3897	559	1.0(1419)	1.2447	22.266	3290										
57.773	11.537	2805	94.8	(978)	1.2876	22.309	2837	1.699	4820	2.643	0.28620	27.510	0.3753	5230	21.436	190.1	0.92 0.47
COMBUSTOR	0	39	32	7													
58.793	94.255	3178	555	3.0(1141)	1.2847	21.619	3064										
58.793	6.225	1662	33.1	(598)	1.3407	21.620	2264	2.397	5426	2.543	0.28438	27.510	0.3777	5242	23.981	190.5	0.92 0.27
COMBUSTOR	0	40	33	6													
60.803	47.334	4453	548	6.0(1637)	1.2031	22.882	3412										
60.803	17.775	3746	20.8	(1342)	1.2384	22.976	3168	1.317	4172	2.601	0.29428	27.510	0.3850	5228	19.078	190.1	0.92 0.65
COMBUSTOR	0	41	34	4													
62.223	49.779	4327	543	5.0(1587)	1.2135	22.761	3387										
62.223	16.725	3533	170	3.0(1256)	1.2514	22.832	3103	1.393	4322	2.671	0.30226	27.510	0.3553	5217	20.300	189.7	0.92 0.61
COMBUSTOR	0	42	35	4													
64.687	44.338	4568	534	0.0(1682)	1.1924	23.041	3428										
64.687	19.965	4006	239	8.0(1445)	1.2208	23.153	3241	1.184	3837	2.689	0.28650	27.510	0.3749	5198	17.084	188.9	0.92 0.70
COMBUSTOR	0	43	36	4													
65.063	40.645	4651	532	4.0(1715)	1.1839	23.135	3440										
65.063	20.992	4194	281	9.0(1523)	1.2062	23.257	3291	1.076	3540	2.700	0.28635	27.510	0.4032	5195	14.684	186.8	0.92 0.74
COMBUSTOR	0	44	37	21													
65.063	40.645	4785	623	0.0(1773)	1.1754	23.061	3482										
65.063	24.461	4449	421	8.0(1629)	1.1901	23.184	3369	0.942	3173	2.719	0.28635	27.510	0.4032	5241	13.133	190.5	0.92 0.74
NOZZLE	0	45	38	5													
87.299	40.645	4651	532	4.0(1682)	1.1839	23.135	3440										
87.299	0.385	1616	708	8.0(588)	1.3133	23.353	2254	3.497	7881	2.700	0.02527	27.510	0.2502	7158	3.095	260.2	0.92 0.74
NOZZLE	0	46	40	8													
87.299	40.645	4785	623	0.0(1773)	1.1754	23.061	3482										
87.299	1.257	2511	451	4.0(884)	1.2648	23.352	2621	2.798	7332	2.719	0.05545	27.510	1.9371	6893	6.318	250.6	0.92 0.74
NOZZLE	0	47	41	5													
87.299	40.645	4785	623	0.0(1773)	1.1754	23.061	3482										
87.299	0.385	1916	973	0.0(623)	1.3087	23.353	2310	3.485	8053	2.719	0.02448	27.510	4.3880	7319	3.063	266.0	0.92 0.74
PICTIVE	0	48	41	0													
COMBUSTOR	0	49	42	0													
65.063	277.035	5355	532	4.0(1907)	1.1627	23.899	3599										
65.063	0.385	1930	1221	8.0(474)	1.3171	24.463	2024	4.629	9369	2.545	0.03735	27.510	2.8754	8295	5.439	301.5	0.92 1.00
PICTIVE	0	50	42	0													
NOZZLE	0	51	43	0													
87.299	27.007	4585	505	0.0(1687)	1.1819	23.130	3413										
87.299	1.457	2862	392	9.0(902)	1.2792	23.352	2693	2.489	6703	2.729	0.05545	27.510	1.9371	6455	3.776	234.6	0.92 0.74

READING = 0057 HLOCK = 122 TIME = 234.713 MACH 6.0 PI = 744.249 TI = 2980.6

XAB	P=IB	P=OB	POA	GOX	U=IB	Q=OB	CAMALL	P=IB/P80	P=IB/P10	P=OB/PS0	P=OB/P10
6.981E-01	1.060E 00	0.000	-4.347E-01	0.000	0.000	0.000	2.470E-02	2.750E 00	1.424E-03	0.000	0.000
1.836E 01	1.060E 00	0.000	-3.529E 01	0.000	0.000	0.000	1.634E 02	2.750E 00	1.424E-03	0.000	0.000
3.070E 01	2.230E 00	0.000	-1.687E 02	0.000	0.000	0.000	5.053E 02	5.786E 00	2.995E-03	0.000	0.000
3.508E 01	3.978E 00	0.000	-3.698E 02	0.000	0.000	0.000	6.804E 02	1.032E 01	5.345E-03	0.000	0.000
3.520E 01	3.997E 00	5.719E 00	-4.363E 02	0.000	0.000	0.000	6.858E 02	1.037E 01	5.370E-03	1.484E 01	7.684E-03
3.521E 01	3.998E 00	5.684E 00	-4.364E 02	0.000	0.000	0.000	6.860E 02	1.037E 01	5.371E-03	1.475E 01	7.685E-03
3.555E 01	4.050E 00	3.721E 00	-4.444E 02	0.000	0.000	0.000	7.204E 02	1.051E 01	5.442E-03	9.656E 00	5.000E-03
3.587E 01	3.993E 00	1.875E 00	-4.602E 02	-2.808E 02	-2.808E 02	0.000	7.532E 02	1.036E 01	5.365E-03	4.855E 00	2.519E-03
3.606E 01	3.996E 00	2.548E 00	-4.707E 02	-2.838E 02	-2.838E 02	0.000	7.724E 02	1.036E 01	5.365E-03	4.855E 00	2.519E-03
3.648E 01	4.236E 00	4.058E 00	-4.919E 02	-2.907E 02	-2.907E 02	0.000	8.160E 02	1.099E 01	5.692E-03	1.053E 01	5.453E-03
3.701E 01	4.315E 00	5.968E 00	-5.186E 02	-3.131E 02	-2.999E 02	-1.321E 01	8.719E 02	1.120E 01	5.795E-03	1.588E 01	8.014E-03
3.733E 01	4.131E 00	7.125E 00	-5.328E 02	-3.234E 02	-3.056E 02	-1.775E 01	9.067E 02	1.072E 01	5.591E-03	1.899E 01	9.573E-03
3.803E 01	3.735E 00	1.262E 01	-5.489E 02	-3.401E 02	-3.189E 02	-2.726E 01	9.829E 02	9.692E 00	5.019E-03	3.274E 01	1.696E-02
3.835E 01	5.087E 00	1.516E 01	-5.472E 02	-3.576E 02	-3.360E 02	-3.160E 01	1.019E 03	1.320E 01	6.835E-03	3.938E 01	2.037E-02
3.875E 01	6.751E 01	1.484E 01	-5.461E 02	-3.730E 02	-3.372E 02	-3.688E 01	1.064E 03	1.752E 01	9.071E-03	3.849E 01	1.993E-02
3.882E 01	7.036E 00	1.477E 01	-5.460E 02	-3.733E 02	-3.395E 02	-3.784E 01	1.072E 03	1.831E 01	9.481E-03	3.834E 01	1.985E-02
3.901E 01	7.840E 00	1.528E 01	-5.441E 02	-3.865E 02	-3.360E 02	-4.031E 01	1.093E 03	2.034E 01	1.053E-02	3.966E 01	2.054E-02
3.933E 01	1.370E 01	1.616E 01	-5.429E 02	-4.032E 02	-3.587E 02	-4.452E 01	1.131E 03	3.570E 01	1.849E-02	4.194E 01	2.172E-02
3.950E 01	1.682E 01	1.311E 01	-5.561E 02	-4.138E 02	-3.641E 02	-4.668E 01	1.150E 03	4.364E 01	2.261E-02	3.403E 01	1.762E-02
3.982E 01	1.795E 01	7.225E 00	-5.781E 02	-4.349E 02	-3.822E 02	-4.668E 01	1.188E 03	4.659E 01	2.412E-02	1.875E 01	9.708E-03
4.000E 01	1.457E 01	5.479E 00	-5.946E 02	-4.449E 02	-3.920E 02	-5.296E 01	1.208E 03	4.820E 01	2.496E-02	1.422E 01	7.362E-03
4.032E 01	2.498E 01	2.300E 00	-6.332E 02	-4.608E 02	-4.110E 02	-5.697E 01	1.246E 03	6.482E 01	3.395E-02	3.988E 00	3.090E-03
4.040E 01	2.651E 01	2.644E 01	-6.456E 02	-4.738E 02	-4.157E 02	-5.811E 01	1.255E 03	6.874E 01	3.562E-02	6.808E 00	3.522E-03
4.041E 01	2.671E 01	2.688E 00	-6.470E 02	-4.748E 02	-4.163E 02	-5.820E 01	1.256E 03	6.931E 01	3.589E-02	6.975E 00	3.612E-03
4.112E 01	4.452E 01	6.685E 00	-8.079E 02	-5.816E 02	-4.753E 02	-1.063E 02	1.363E 03	1.155E 02	5.982E-02	1.735E 01	8.982E-03
4.132E 01	4.472E 01	6.729E 00	-8.098E 02	-5.831E 02	-4.760E 02	-1.072E 02	1.364E 03	1.160E 02	6.002E-02	1.746E 01	9.042E-03
4.138E 01	4.601E 01	7.019E 00	-8.230E 02	-5.938E 02	-4.805E 02	-1.132E 02	1.371E 03	1.194E 02	6.182E-02	1.821E 01	9.431E-03
4.150E 01	4.834E 01	9.493E 00	-8.467E 02	-6.138E 02	-4.889E 02	-1.249E 02	1.385E 03	1.254E 02	6.495E-02	2.403E 01	1.276E-02
4.246E 01	5.126E 01	2.976E 01	-9.755E 02	-8.233E 02	-5.547E 02	-2.559E 02	1.500E 03	1.330E 02	6.825E-02	7.732E 01	3.555E-02
4.410E 01	6.632E 01	4.445E 01	-1.002E 03	-1.274E 03	-7.309E 02	-2.543E 02	1.699E 03	1.721E 02	8.911E-02	1.672E 02	8.660E-02
4.431E 01	6.822E 01	6.336E 01	-1.002E 03	-1.336E 03	-7.550E 02	-2.811E 02	1.724E 03	1.770E 02	9.166E-02	1.644E 02	8.514E-02
4.480E 01	7.271E 01	6.078E 01	-1.010E 03	-1.407E 03	-8.147E 02	-2.673E 02	1.784E 03	1.887E 02	9.770E-02	1.577E 02	8.167E-02
4.482E 01	7.353E 01	6.069E 01	-1.011E 03	-1.409E 03	-8.169E 02	-2.675E 02	1.786E 03	1.882E 02	9.746E-02	1.575E 02	8.154E-02
4.625E 01	5.315E 01	5.315E 01	-9.480E 02	-1.943E 03	-9.944E 02	-9.530E 02	1.962E 03	1.504E 02	7.788E-02	1.379E 02	7.142E-02
4.626E 01	5.786E 01	5.310E 01	-9.473E 02	-1.946E 03	-9.945E 02	-9.530E 02	1.963E 03	1.501E 02	7.778E-02	1.378E 02	7.135E-02
4.731E 01	4.717E 01	4.757E 01	-8.341E 02	-2.274E 03	-1.111E 03	-1.163E 03	2.094E 03	1.224E 02	6.338E-02	1.234E 02	6.392E-02
4.734E 01	4.763E 01	4.740E 01	-8.282E 02	-2.284E 03	-1.114E 03	-1.170E 03	2.098E 03	1.236E 02	6.400E-02	1.230E 02	6.369E-02
4.811E 01	5.824E 01	4.416E 01	-7.312E 02	-2.512E 03	-1.197E 03	-1.315E 03	2.193E 03	1.511E 02	7.825E-02	1.146E 02	5.514E-02
4.878E 01	4.132E 01	4.132E 01	-5.990E 02	-2.695E 03	-1.267E 03	-1.426E 03	2.279E 03	1.072E 02	5.552E-02	1.072E 02	5.552E-02
4.879E 01	4.120E 01	4.120E 01	-5.988E 02	-2.697E 03	-1.268E 03	-1.429E 03	2.279E 03	1.071E 02	5.549E-02	1.071E 02	5.546E-02
4.932E 01	3.904E 01	3.904E 01	-4.859E 02	-2.830E 03	-1.212E 03	-1.509E 03	2.345E 03	1.013E 02	5.246E-02	1.013E 02	5.246E-02
5.073E 01	3.218E 01	3.218E 01	-2.226E 02	-3.149E 03	-1.454E 03	-1.694E 03	2.523E 03	8.350E 01	4.324E-02	8.350E 01	4.324E-02
5.283E 01	2.310E 01	2.310E 01	8.175E 01	-3.549E 03	-1.299E 03	-1.920E 03	2.769E 03	5.994E 01	3.104E-02	5.994E 01	3.104E-02
5.335E 01	2.081E 01	2.081E 01	1.388E 02	-3.634E 03	-1.266E 03	-1.967E 03	2.853E 03	5.399E 01	2.798E-02	5.399E 01	2.798E-02
5.408E 01	1.934E 01	1.934E 01	2.165E 02	-3.737E 03	-1.720E 03	-2.037E 03	2.949E 03	5.018E 01	2.598E-02	5.018E 01	2.598E-02
5.484E 01	1.785E 01	1.785E 01	2.882E 02	-3.835E 03	-1.700E 03	-2.105E 03	3.046E 03	4.632E 01	2.396E-02	4.632E 01	2.398E-02
5.576E 01	1.636E 01	1.636E 01	3.672E 02	-4.004E 03	-1.527E 03	-2.141E 03	3.164E 03	4.244E 01	2.198E-02	4.244E 01	2.198E-02
5.627E 01	1.553E 01	1.553E 01	5.360E 02	-4.076E 03	-1.554E 03	-2.221E 03	3.209E 03	4.029E 01	2.087E-02	4.029E 01	2.087E-02
5.632E 01	1.544E 01	1.544E 01	5.408E 02	-4.053E 03	-1.557E 03	-2.226E 03	3.216E 03	2.014E 01	1.043E-02	4.068E 01	2.074E-02
5.846E 01	7.762E 00	7.762E 00	5.504E 02	-4.100E 03	-1.564E 03	-2.236E 03	3.234E 03	2.014E 01	1.043E-02	3.971E 01	2.044E-02
5.854E 01	1.508E 01	1.508E 01	5.569E 02	-4.110E 03	-1.568E 03	-2.243E 03	3.244E 03	3.913E 01	2.025E-02	3.913E 01	2.026E-02
5.862E 01	1.462E 01	1.462E 01	5.759E 02	-4.115E 03	-1.581E 03	-2.264E 03	3.280E 03	3.795E 01	1.965E-02	3.795E 01	1.965E-02
5.705E 01	1.389E 01	1.389E 01	5.898E 02	-4.173E 03	-1.591E 03	-2.282E 03	3.309E 03	3.604E 01	1.866E-02	3.604E 01	1.866E-02
5.777E 01	1.154E 01	1.154E 01	6.242E 02	-4.260E 03	-1.622E 03	-2.338E 03	3.402E 03	2.994E 01	1.550E-02	2.994E 01	1.550E-02
5.879E 01	6.225E 00	6.225E 00	6.444E 02	-4.344E 03	-1.659E 03	-2.405E 03	3.532E 03	1.615E 01	8.364E-03	1.615E 01	8.364E-03
6.060E 01	1.777E 01	1.777E 01	6.476E 02	-4.550E 03	-2.019E 03	-2.531E 03	3.790E 03	4.612E 01	2.386E-02	4.612E 01	2.386E-02



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READING = 0057 BLOCK = 122 TIME = 234.713 MACH 6.0 PT = 744.249 TT = 2980.5

X	DORAG	CORAG	CF	MC
4.004E 01	1.134E 02	1.134E 02	2.216E-03	4.354E-02
4.041E 01	1.903E-01	1.136E 02	2.616E-03	3.903E-02
4.131E 01	1.804E 01	1.316E 02	2.799E-03	5.528E-02
4.132E 01	1.816E-01	1.318E 02	2.518E-03	6.058E-02
4.138E 01	1.136E 00	1.330E 02	2.533E-03	6.140E-02
4.150E 01	2.027E 00	1.350E 02	2.569E-03	6.394E-02
4.246E 01	1.572E 01	1.507E 02	2.720E-03	7.127E-02
4.410E 01	2.223E 01	1.729E 02	2.954E-03	7.403E-02
4.431E 01	3.353E 00	1.753E 02	2.994E-03	7.265E-02
4.480E 01	5.516E 00	1.808E 02	2.996E-03	7.191E-02
4.482E 01	1.972E-01	1.810E 02	2.984E-03	7.218E-02
4.625E 01	1.708E 01	1.981E 02	3.214E-03	6.503E-02
4.626E 01	1.227E-01	1.982E 02	2.877E-03	7.366E-02
4.731E 01	1.216E 01	2.104E 02	2.766E-03	7.118E-02
4.734E 01	3.789E-01	2.107E 02	2.885E-03	6.848E-02
4.811E 01	8.663E 00	2.194E 02	2.901E-03	6.813E-02
4.878E 01	7.662E 00	2.271E 02	3.174E-03	5.869E-02
4.879E 01	1.166E-01	2.272E 02	2.871E-03	6.537E-02
4.932E 01	5.743E 00	2.329E 02	2.830E-03	6.391E-02
5.073E 01	1.453E 01	2.475E 02	2.787E-03	5.753E-02
5.283E 01	2.074E 01	2.682E 02	2.804E-03	4.634E-02
5.332E 01	4.072E 00	2.732E 02	2.920E-03	4.168E-02
5.408E 01	7.489E 00	2.806E 02	2.890E-03	3.981E-02
5.484E 01	7.316E 00	2.879E 02	2.897E-03	3.743E-02
5.576E 01	8.579E 00	2.965E 02	2.892E-03	3.510E-02
5.627E 01	2.906E 00	2.994E 02	2.875E-03	3.164E-02
5.632E 01	4.273E-01	3.999E 02	3.038E-03	2.543E-02
5.646E 01	1.119E 00	3.010E 02	2.841E-03	2.671E-02
5.654E 01	6.454E-01	3.016E 02	3.261E-03	2.738E-02
5.682E 01	2.248E 00	3.039E 02	3.024E-03	2.908E-02
5.705E 01	1.769E 00	3.056E 02	3.003E-03	2.800E-02
5.777E 01	5.782E 00	3.114E 02	2.944E-03	2.576E-02
5.879E 01	8.558E 00	3.200E 02	2.822E-03	1.768E-02
6.080E 01	1.503E 01	3.350E 02	2.592E-03	3.735E-02
6.222E 01	1.023E 01	3.432E 02	3.112E-03	3.044E-02
6.469E 01	1.843E 01	3.637E 02	3.127E-03	3.214E-02
6.506E 01	2.454E 00	3.661E 02	3.283E-03	3.022E-02
6.510E 01	2.508E-01	3.664E 02	3.385E-03	3.057E-02
6.530E 01	1.278E 00	3.677E 02	3.380E-03	3.043E-02
6.686E 01	1.108E 01	3.787E 02	3.252E-03	2.314E-02
6.763E 01	4.197E 00	3.829E 02	3.224E-03	2.068E-02
6.840E 01	4.426E 00	3.874E 02	3.160E-03	1.589E-02
6.912E 01	3.561E 00	3.909E 02	3.116E-03	1.295E-02
6.973E 01	2.667E 00	3.936E 02	3.088E-03	1.128E-02
7.068E 01	3.619E 00	3.972E 02	3.045E-03	9.016E-03
7.111E 01	1.861E 00	3.987E 02	3.038E-03	8.262E-03
7.264E 01	4.480E 00	4.031E 02	2.975E-03	6.150E-03
7.379E 01	3.604E-01	4.035E 02	2.961E-03	5.718E-03
7.354E 01	1.481E 00	4.050E 02	2.889E-03	3.906E-03
7.355E 01	2.397E-03	4.050E 02	2.869E-03	3.896E-03
7.487E 01	8.635E-01	4.059E 02	2.932E-03	5.122E-03
7.772E 01	2.203E 00	4.081E 02	2.996E-03	7.985E-03
8.162E 01	2.529E 00	4.106E 02	2.933E-03	6.281E-03
8.443E 01	1.078E 00	4.117E 02	2.875E-03	4.808E-03
8.729E 01	4.543E-01	4.121E 02	2.915E-03	6.488E-03
8.750E 01	0.000	4.121E 02	2.915E-03	8.442E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST..... 1260. (LBF)  
 MEASURED THRUST..... 1650. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1783. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2016. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5678  
 MEASURED THRUST COEFFICIENT..... 0.6645

ANGLE OF ATTACK ..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9855  
 ADDITIVE DRAG COEFFICIENT..... 0.0004  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1606  
 DELTA PT2..... 0.1181 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3722  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1629  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.6921  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9047  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9337  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8858  
 ENTHALPY AT PO = SUPERSONIC..... 3.75 (BTU/LBM)  
 ENTHALPY AT PO = SUBSONIC..... 29.56 (BTU/LBM)

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

STREAM THRUST..... 6576. (LBF)  
 NET THRUST..... 1593. (LBF)  
 SPECIFIC IMPULSE..... 1933. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.6374

MOMENTUM AND FORCES

COMBUSTOR

INLET FRICTION DRAG..... 113.4 (LBF)  
 INLET MOMENTUM CHANGE..... -759.0 (LBF)  
 COMBUSTOR FRICTION DRAG..... 252.7 (LBF)  
 COMBUSTOR STRUT DRAG..... 4.50 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 959. (LBF)  
 NOZZLE FRICTION DRAG..... 46.00 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1859. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1305. (LBF)  
 EXTERNAL FRICTION DRAG..... 67.40 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1163. (LBF)  
 TOTAL EXTERNAL DRAG..... -1231. (LBF)  
 TOTAL STRUT DRAG..... 5.50 (LBF)  
 CAVITY FORCE..... -1227. (LBF)  
 CALCULATED LOAD CELL FORCE..... -996. (LBF)  
 MEASURED LOAD CELL FORCE..... -807. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0. -121.9.

FUEL-AIR RATIO..... 0.0307  
 EQUIVALENCE RATIO..... 0.923  
 COMBUSTOR EFFICIENCY..... 0.737  
 TOTAL PRESSURE RATIO..... 0.1467  
 COMBUSTOR EFFECTIVENESS..... 0.7199  
 INJECTOR DISCHARGE COEFFICIENTS 0.6144, 0.7333, 0.7757, 0.7471

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C6..... 0.9543  
 NOZZLE COEFFICIENT = CT..... 0.8750  
 PROCESS EFFICIENCY..... 0.9001  
 KINETIC ENERGY EFFICIENCY..... 0.8978

STATIONS

FUEL INJECTORS

NOMINAL COWL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3228 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.207 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.547 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 67.299 (IN)  
 STRUT LEADING EDGE..... 56.463 (IN)  
 STRUT TRAILING EDGE..... 65.063 (IN)  
 COMBUSTOR EXIT..... 65.063 (IN)

INJECTORS  
 1A  
 1B  
 1C  
 2A  
 2C  
 3A  
 3B  
 4  
 STATION  
 40.400  
 41.308  
 44.300  
 48.783  
 46.250  
 54.073  
 56.258  
 48.808  
 VALVE  
 A  
 B  
 D  
 E

Reading 57

$t = 265.31 \text{ sec.}$

HAWKJET PERFORMANCE

SUMMARY REPORT

1-29-75  
Reg. com.

WIND TUNNEL	P	T	N	GAMMA	MOLWT	SUNV	MACH	VEL	S	W/A	"	A/VAC	MUPTM	Q	IVAC	PHI	ETAC
0.000	744.749	2977	662.4( 780)	1.2934	26.966	2571											
0.000	0.385	402	-32.3( 96)	1.3960	26.965	983	5.999	5896	1.825	0.10580	26.740	0.9860	4998	9.695	186.9		
SPRIKE TIP N8	2	0	0														
0.600	17.025	2977	662.4( 788)	1.2933	26.965	2571											
0.600	16.079	2908	641.6( 767)	1.2955	26.965	2543	0.401	1021	2.081	0.10580	26.740	0.9860	4912	1.078	183.7		
WIND TUNNEL	3	0	0														
0.000	744.749	2977	662.4( 788)	1.2934	26.966	2571											
0.000	0.371	399	-33.2( 96)	1.3960	26.965	979	6.029	5900	1.825	0.10357	26.177	0.9860	4895	9.496	187.0		
SPRIKE TIP N8	4	0	0														
0.600	17.025	2977	662.4( 788)	1.2933	26.965	2571											
0.600	16.162	2911	642.7( 760)	1.2954	26.965	2544	0.391	995	2.081	0.10357	26.177	0.9860	4895	1.002	187.0		
INLET THROAT	5	0	0														
40.400	275.627	2928	647.6( 773)	1.2950	26.966	2551											
40.400	16.056	1465	232.8( 362)	1.3449	26.965	1842	2.474	4537	1.888	0.93639	26.740	0.1115	4846	66.318	188.8		
INLET UPN8K	6	0	0														
40.400	275.627	2928	647.6( 773)	1.2950	26.966	2551											
40.400	13.780	1408	217.7( 347)	1.3532	26.965	1808	2.566	4639	1.888	0.85126	26.740	0.1226	4286	61.371	180.4		
INLET DN8K	7	0	0														
40.400	121.184	2928	647.6( 773)	1.2950	26.966	2551											
40.400	103.805	2826	617.2( 743)	1.2982	26.966	2510	0.493	1237	1.945	0.85126	26.740	0.1226	4286	16.350	180.4		
COM8USTOR	8	1	21														
40.410	226.249	2889	650.5( 797)	1.2975	27.631	2597											
40.410	12.977	1430	219.6( 369)	1.3532	27.631	1866	2.489	4644	1.974	0.93981	26.861	0.1115	4245	67.820	158.1	0.11	0.07
COM8USTOR	9	2	21														
41.294	167.542	2820	653.8( 807)	1.3013	26.508	2624											
41.294	21.038	1703	308.0( 443)	1.3408	26.508	2069	2.010	4160	2.055	0.94546	26.931	0.1112	4081	61.118	151.5	0.21	0.04
COM8USTOR	10	3	21														
41.304	173.616	2779	653.8( 799)	1.3032	26.466	2609											
41.304	21.128	1661	308.8( 432)	1.3432	26.465	2047	2.029	4158	2.048	0.94576	26.931	0.1112	4079	61.061	151.5	0.21	0.01
COM8USTOR	11	4	21														
41.369	171.503	2772	653.4( 792)	1.3035	26.459	2606											
41.369	21.722	1673	314.4( 453)	1.3427	26.459	2055	2.005	4119	2.048	0.94627	26.931	0.1111	4066	60.574	151.0	0.21	0.00
COM8USTOR	12	6	21														
41.500	165.507	2769	652.8( 791)	1.3037	26.458	2605											
41.500	23.665	1724	329.5( 470)	1.3404	26.458	2084	1.930	4022	2.050	0.94644	26.931	0.1111	4040	59.154	150.0	0.21	0.00
COM8USTOR	13	6	3														
42.460	136.033	2788	646.8( 797)	1.3025	26.498	2610											
42.460	28.078	1906	371.8( 520)	1.3327	26.497	2183	1.699	3709	2.067	0.93715	26.931	0.1122	3912	54.024	145.3	0.21	0.03
COM8USTOR	14	7	3														
44.089	104.345	3163	634.1( 910)	1.2844	26.945	2738											
44.089	46.777	2636	462.9( 743)	1.3021	26.946	2517	1.163	2927	2.115	0.90549	26.931	0.1161	3841	41.186	142.6	0.21	0.39
COM8USTOR	15	8	2														
44.310	103.511	3163	632.2( 910)	1.2843	26.951	2737											
44.310	47.912	2656	467.3( 749)	1.3014	26.952	2525	1.138	2873	2.115	0.90372	26.931	0.1163	3832	40.344	142.3	0.21	0.39
COM8USTOR	16	9	0														
44.800	101.808	3149	627.6( 903)	1.2848	26.951	2732											
44.800	50.429	2686	476.7( 758)	1.3004	26.952	2538	1.082	2767	2.115	0.89978	26.931	0.1169	3809	38.419	141.4	0.21	0.39
COM8USTOR	17	10	0														
44.804	101.620	3149	627.5( 903)	1.2848	26.951	2732											
44.804	50.423	2686	476.6( 758)	1.3004	26.952	2538	1.083	2768	2.115	0.89990	26.931	0.1168	3809	38.429	141.4	0.21	0.39
COM8USTOR	18	11	13														
46.250	94.674	2640	640.4( 849)	1.3109	23.290	2718											
46.250	46.351	2245	500.7( 710)	1.3243	23.290	2519	1.050	2645	2.298	0.85842	27.251	0.1239	3775	35.281	136.5	0.57	0.03

READING = 005/ BLOCK = 156 TIME = 265.313 NACH 0.0 PT = 744.749 I1 = 2976.9

	P	T	H	GAMMA	MOLFT	SONV	MACH	VEL	S	W/A	R	A/PAC	PUPIT	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	94.626	2640	640.3	(849)	1.3108	23.291	2716										
46.260	48.337	2246	500.6	(710)	1.3242	23.291	2520	1.050	2645	2.298	0.85787	27.251	0.1240	3775	35.256	136.5	0.57 0.08
COMBUSTOR	0	20	13	4													
47.310	90.262	2768	629.0	(899)	1.3036	23.455	2776										
47.310	46.633	2387	485.4	(757)	1.3172	23.455	2582	1.038	2681	2.316	0.79827	27.251	0.1333	3869	33.255	142.0	0.57 0.12
COMBUSTOR	0	21	14	2													
47.329	90.244	2789	628.8	(899)	1.3036	23.456	2776										
47.329	46.690	2388	485.5	(757)	1.3171	23.456	2582	1.037	2678	2.317	0.79809	27.251	0.1333	3870	33.218	142.0	0.57 0.12
COMBUSTOR	0	22	15	4													
48.110	86.209	2936	621.0	(949)	1.2965	23.614	2831										
48.110	44.588	2518	470.0	(800)	1.3106	23.615	2636	1.043	2749	2.333	0.74387	27.251	0.1430	3962	31.785	145.4	0.57 0.18
COMBUSTOR	0	23	16	3													
48.779	84.469	2974	615.2	(962)	1.2946	23.665	2844										
48.779	32.526	2379	401.4	(751)	1.3147	23.665	2564	1.276	3271	2.338	0.68465	27.251	0.1534	4065	34.801	149.2	0.57 0.20
COMBUSTOR	0	24	17	3													
49.309	84.011	2977	611.2	(963)	1.2943	23.678	2844										
49.309	26.979	2381	361.7	(716)	1.3180	23.679	2512	1.406	3533	2.338	0.64031	27.251	0.1662	4141	35.136	151.9	0.57 0.20
COMBUSTOR	0	25	18	4													
50.719	76.219	3190	601.6	(1035)	1.2837	23.910	2916										
50.719	22.794	2419	321.6	(760)	1.3102	23.912	2567	1.458	3743	2.362	0.54572	27.251	0.1950	4308	31.742	158.1	0.57 0.29
COMBUSTOR	0	26	19	4													
52.819	69.093	3365	589.5	(1095)	1.2745	24.116	2973										
52.819	17.250	2456	256.7	(770)	1.3062	24.121	2572	1.587	4080	2.381	0.44728	27.251	0.2379	4507	28.364	165.4	0.57 0.37
COMBUSTOR	0	27	20	3													
53.319	69.916	3348	586.9	(1089)	1.2753	24.108	2967										
53.319	15.646	2386	235.6	(746)	1.3088	24.111	2538	1.652	4193	2.379	0.42900	27.251	0.2480	4845	27.982	166.8	0.57 0.37
COMBUSTOR	0	28	21	4													
54.069	66.385	3442	583.3	(1122)	1.2702	24.213	2996										
54.069	15.043	2471	226.1	(774)	1.3045	24.214	2973	1.643	4228	2.389	0.44039	27.251	0.2631	4597	26.568	168.7	0.57 0.41
COMBUSTOR	0	29	22	4													
54.829	63.370	3528	579.9	(1152)	1.2654	24.312	3022										
54.829	14.512	2548	216.2	(799)	1.3006	24.320	2603	1.639	4266	2.398	0.38241	27.251	0.2782	4648	25.353	170.5	0.57 0.44
COMBUSTOR	0	30	23	3													
55.760	63.405	3512	575.9	(1146)	1.2662	24.306	3016										
55.760	12.696	2457	186.6	(767)	1.3039	24.313	2559	1.725	4414	2.396	0.35892	27.251	0.2964	4703	24.421	172.6	0.57 0.44
COMBUSTOR	0	31	24	5													
56.254	49.261	3848	574.0	(1263)	1.2436	24.671	3108										
56.254	11.733	2846	188.6	(898)	1.2854	24.694	2714	1.618	4392	2.435	0.28926	27.251	0.3678	4825	19.742	177.1	0.57 0.58
COMBUSTOR	0	32	25	5													
56.309	60.433	3462	573.8	(1128)	1.2687	24.260	3000										
56.309	8.663	2233	126.1	(691)	1.3125	24.266	2450	1.932	4734	2.397	0.24835	27.251	0.3690	4828	21.212	177.2	0.57 0.42
COMBUSTOR	0	33	26	2													
56.449	60.617	3459	573.3	(1127)	1.2688	24.258	2999										
56.449	8.526	2221	122.5	(686)	1.3129	24.264	2444	1.943	4750	2.396	0.24863	27.251	0.3716	4834	21.135	177.4	0.57 0.42
COMBUSTOR	0	34	27	6													
56.529	51.055	3401	573.0	(1247)	1.2447	24.622	3096										
56.529	11.196	2755	173.9	(866)	1.2893	24.642	2677	1.669	4469	2.430	0.28964	27.251	0.3673	4838	20.114	177.5	0.57 0.56
COMBUSTOR	0	35	28	4													
56.809	52.626	3754	572.0	(1230)	1.2516	24.574	3083										
56.809	10.650	2666	160.1	(836)	1.2931	24.591	2640	1.720	4540	2.425	0.28868	27.251	0.3686	4851	20.369	178.0	0.57 0.54
COMBUSTOR	0	36	29	3													
57.035	52.507	3774	571.2	(1237)	1.2504	24.598	3088										
57.035	10.692	2686	158.6	(843)	1.2920	24.616	2648	1.716	4544	2.426	0.28808	27.251	0.3693	4860	20.343	178.3	0.57 0.55
COMBUSTOR	0	37	30	4													
57.759	51.240	3846	568.7	(1262)	1.2457	24.643	3106										
57.759	10.825	2771	157.0	(871)	1.2879	24.706	2680	1.694	4539	2.431	0.28352	27.251	0.3753	4865	19.999	179.3	0.57 0.58

COMBUSTOR	P	I	M	GAMMA	MOL-FI	SONV	MACH	VEL	B	W/A	A/C	BURTM	C	IVAC	PHI	ETAC
50.770	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
58.770	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
58.770	5.012	1037	42.2( 495)	1.3406	23.950	2134	2.398	5119	2.342	0.28171	27.251	0.3771	4898	28.409	174.7	0.57 0.31
COMBUSTOR	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
60.780	53.319	3010	500.8(1256)	1.2406	24.088	3101										
60.780	10.950	2740	104.8( 860)	1.2050	24.710	2066	1.711	4562	2.420	0.29151	27.251	0.3050	4000	20.000	170.4	0.57 0.50
COMBUSTOR	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
62.200	45.107	4000	557.2(1461)	1.2044	25.162	3227										
62.200	17.381	3724	254.1(1203)	1.2301	25.455	3001	1.290	3094	2.402	0.29941	27.251	0.3553	4000	10.120	179.1	0.57 0.09
COMBUSTOR	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
64.673	41.480	4330	550.2(1303)	1.1936	25.520	3245										
64.673	10.776	3972	280.5(1292)	1.2212	25.642	3067	1.100	3610	2.470	0.20301	27.251	0.3709	4007	10.950	170.6	0.57 0.92
COMBUSTOR	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
65.049	30.003	4067	509.0(1400)	1.1900	25.481	3236										
65.049	16.780	3994	275.7(1265)	1.2250	25.591	3046	1.214	3097	2.474	0.20305	27.251	0.4032	4005	10.160	170.9	0.57 0.90
COMBUSTOR	0 36 31	313	505.4(1014)	1.2053	23.949	2091										
65.049	30.003	4068	509.0(1400)	1.1859	25.413	3204										
65.049	10.810	4140	306.4(1350)	1.2104	25.549	3123	1.130	3549	2.494	0.20305	27.251	0.4032	4029	14.551	180.9	0.57 0.90
NOZZLE	44 37 5															
67.285	30.003	4067	509.0(1400)	1.1900	25.481	3236										
67.285	1.073	2100	302.5( 856)	1.2905	25.639	2347	2.077	0750	2.474	0.05093	27.251	1.0371	0252	5.705	229.4	0.57 0.90
NOZZLE	45 30 5															
67.285	30.003	4067	509.0(1400)	1.1900	25.481	3236										
67.285	0.358	1710	517.0( 502)	1.3190	25.639	2097	3.404	7103	2.474	0.02715	27.251	3.9105	0573	3.002	241.2	0.57 0.90
NOZZLE	46 39 5															
67.285	30.003	4068	509.0(1400)	1.1859	25.413	3204										
67.285	1.124	2123	529.0( 709)	1.2924	25.639	2420	2.042	0007	2.494	0.05093	27.251	1.9171	0392	8.879	234.0	0.57 0.90
NOZZLE	47 40 5															
67.285	30.003	4068	509.0(1400)	1.1859	25.413	3204										
67.285	0.345	1826	402.5( 934)	1.3139	25.639	2137	3.472	7480	2.494	0.02621	27.251	4.0394	0742	3.030	257.4	0.57 0.90
FICTIVE	COMBUSTOR	67 60 0														
65.049	0.368	1142	479.2( 321)	1.3505	25.955	1719	0.772	0201	2.325	0.04040	27.251	2.2901	7172	3.921	263.2	0.57 1.00
FICTIVE	NOZZLE	68 61 0														
67.285	25.229	4435	530.5(1400)	1.1937	25.473	3214										
67.285	1.313	2409	425.2( 762)	1.3000	25.619	2497	2.513	0270	2.504	0.05093	27.251	1.9371	5968	5.355	219.0	0.57 0.90

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XAB	PaH	PoH	PDA	DOX	WIR	WOD	CWALL	P-Is/P80	P-1H/P10	P-Ob/P80	P-Ob/P10
6.467E 01	1.878E 01	1.878E 01	2.777E 02	-4.055E 03	-1.842E 03	-2.214E 03	4.289E 03	4.878E 01	2.521E-02	4.878E 01	2.521E-02
6.505E 01	1.459E 01	1.899E 01	2.777E 02	-4.088E 03	-1.851E 03	-2.237E 03	4.337E 03	3.788E 01	1.959E-02	4.931E 01	2.550E-02
6.509E 01	1.459E 01	1.901E 01	2.777E 02	-4.042E 03	-1.852E 03	-2.240E 03	4.342E 03	3.782E 01	1.959E-02	4.937E 01	2.553E-02
6.529E 01	1.417E 01	1.912E 01	2.777E 02	-4.008E 03	-1.857E 03	-2.252E 03	4.368E 03	3.679E 01	1.952E-02	4.966E 01	2.568E-02
6.695E 01	1.067E 01	7.410E 00	4.217E 02	-4.267E 03	-1.891E 03	-2.336E 03	4.583E 03	2.771E 01	1.433E-02	1.924E 01	9.950E-03
6.762E 01	7.948E 00	8.505E 00	5.966E 02	-4.267E 03	-1.902E 03	-2.364E 03	4.665E 03	2.064E 01	1.067E-02	2.209E 01	1.142E-02
6.839E 01	4.829E 00	6.833E 00	7.897E 02	-4.311E 03	-1.914E 03	-2.397E 03	4.760E 03	1.252E 01	6.472E-03	1.774E 01	9.175E-03
6.911E 01	3.661E 00	5.270E 00	9.210E 02	-4.351E 03	-1.923E 03	-2.428E 03	4.846E 03	9.508E 00	4.916E-03	1.368E 01	7.076E-03
6.972E 01	2.682E 00	4.331E 00	1.006E 03	-4.383E 03	-1.929E 03	-2.455E 03	4.922E 03	6.952E 00	3.592E-03	1.123E 01	5.858E-03
7.067E 01	1.898E 00	2.950E 00	1.099E 03	-4.429E 03	-1.936E 03	-2.493E 03	5.036E 03	4.912E 00	2.540E-03	7.600E 00	3.961E-03
7.110E 01	1.538E 00	2.492E 00	1.130E 03	-4.447E 03	-1.938E 03	-2.509E 03	5.088E 03	3.983E 00	2.041E-03	6.991E 00	3.615E-03
7.263E 01	1.182E 00	1.775E 00	1.213E 03	-4.445E 03	-1.945E 03	-2.549E 03	5.273E 03	2.992E 00	1.507E-03	4.609E 00	2.383E-03
7.278E 01	1.119E 00	1.503E 00	1.219E 03	-4.498E 03	-1.946E 03	-2.532E 03	5.290E 03	2.695E 00	1.497E-03	4.040E 00	2.059E-03
7.353E 01	9.419E-01	5.050E-01	1.254E 03	-4.518E 03	-1.949E 03	-2.569E 03	5.374E 03	2.448E 00	1.264E-03	1.311E 00	6.761E-04
7.353E 01	9.419E-01	4.932E-01	1.255E 03	-4.518E 03	-1.949E 03	-2.569E 03	5.375E 03	2.448E 00	1.264E-03	1.297E 00	6.703E-04
7.466E 01	6.390E-01	0.000	1.271E 03	-4.558E 03	-1.954E 03	-2.604E 03	5.427E 03	1.649E 00	8.536E-04	0.000	0.000
7.777E 01	1.302E 00	0.000	1.310E 03	-4.565E 03	-1.961E 03	-2.604E 03	5.525E 03	3.389E 00	1.732E-03	0.000	0.000
8.161E 01	1.283E 00	0.000	1.366E 03	-4.573E 03	-1.969E 03	-2.604E 03	5.630E 03	3.337E 00	1.735E-03	0.000	0.000
8.442E 01	1.070E 00	0.000	1.392E 03	-4.579E 03	-1.975E 03	-2.604E 03	5.684E 03	2.772E 00	1.437E-03	0.000	0.000
8.728E 01	1.510E 00	0.000	1.432E 03	-4.590E 03	-1.986E 03	-2.604E 03	5.707E 03	3.921E 00	2.028E-03	0.000	0.000
8.728E 01	1.511E 00	0.000	1.431E 03	-4.590E 03	-1.986E 03	-2.604E 03	5.707E 03	3.924E 00	2.029E-03	0.000	0.000

READING = 0057 BLOCK = 156 TIME = 265.313 NACH 6.0 PI = 704.109 TT = 2074.9

X	DDHAG	CDHAG	CF	HQ
4.040E 01	1.113E 02	1.113E 02	2.222E-03	4.363E-02
4.041E 01	1.683E-01	1.115E 02	2.527E-03	3.006E-02
4.129E 01	1.752E 01	1.290E 02	2.672E-03	4.933E-02
4.130E 01	1.843E-01	1.292E 02	2.480E-03	5.260E-02
4.137E 01	1.162E 00	1.304E 02	2.460E-03	5.366E-02
4.150E 01	2.315E 00	1.327E 02	2.483E-03	5.656E-02
4.246E 01	1.643E 01	1.491E 02	2.571E-03	6.004E-02
4.409E 01	2.486E 01	1.740E 02	2.727E-03	7.256E-02
4.431E 01	3.098E 00	1.771E 02	2.933E-03	6.743E-02
4.480E 01	6.920E 00	1.840E 02	2.944E-03	6.744E-02
4.480E 01	5.245E-02	1.840E 02	2.944E-03	6.744E-02
4.625E 01	2.045E 01	2.045E 02	3.302E-03	5.984E-02
4.626E 01	1.453E-01	2.046E 02	3.302E-03	5.984E-02
4.731E 01	1.357E 01	2.182E 02	2.784E-03	6.974E-02
4.733E 01	2.168E-01	2.184E 02	2.876E-03	6.746E-02
4.811E 01	9.051E 00	2.275E 02	2.844E-03	6.599E-02
4.878E 01	7.889E 00	2.354E 02	2.819E-03	5.743E-02
4.931E 01	9.518E 00	2.419E 02	2.787E-03	5.179E-02
5.072E 01	1.629E 01	2.582E 02	2.608E-03	4.633E-02
5.262E 01	2.162E 01	2.798E 02	2.704E-03	3.753E-02
5.313E 01	4.927E 00	2.847E 02	2.787E-03	3.407E-02
5.407E 01	7.238E 00	2.919E 02	2.755E-03	3.314E-02
5.483E 01	7.003E 00	2.990E 02	2.785E-03	3.162E-02
5.574E 01	6.343E 00	3.071E 02	2.795E-03	2.855E-02
5.625E 01	2.735E 00	3.100E 02	2.739E-03	2.509E-02
5.631E 01	4.054E-01	3.104E 02	2.881E-03	2.025E-02
5.645E 01	1.042E 00	3.115E 02	2.658E-03	2.135E-02
5.653E 01	6.187E-01	3.121E 02	3.204E-03	2.156E-02
5.681E 01	2.186E 00	3.143E 02	2.451E-03	2.345E-02
5.703E 01	1.665E 00	3.159E 02	2.821E-03	2.346E-02
5.776E 01	3.268E 00	3.212E 02	2.818E-03	2.237E-02
5.870E 01	7.819E 00	3.290E 02	2.824E-03	1.589E-02
6.079E 01	1.463E 01	3.437E 02	2.444E-03	2.681E-02
6.221E 01	9.468E 00	3.531E 02	2.915E-03	3.019E-02
6.467E 01	1.644E 01	3.696E 02	3.187E-03	2.776E-02
6.505E 01	2.421E 00	3.720E 02	3.233E-03	2.532E-02
6.509E 01	2.562E-01	3.722E 02	3.320E-03	2.603E-02
6.529E 01	1.293E 00	3.735E 02	3.318E-03	2.545E-02
6.695E 01	1.047E 01	3.842E 02	3.196E-03	1.918E-02
6.762E 01	3.903E 00	3.861E 02	3.178E-03	1.812E-02
6.839E 01	4.205E 00	3.923E 02	3.121E-03	1.456E-02
6.911E 01	3.458E 00	3.958E 02	3.079E-03	1.217E-02
6.972E 01	2.592E 00	3.984E 02	3.044E-03	1.031E-02
7.110E 01	3.429E 00	4.018E 02	2.988E-03	7.872E-03
7.263E 01	1.352E 00	4.031E 02	2.968E-03	7.142E-03
7.278E 01	4.147E 00	4.073E 02	2.913E-03	5.401E-03
7.353E 01	3.367E-01	4.076E 02	2.899E-03	5.047E-03
7.353E 01	1.339E 00	4.090E 02	2.885E-03	3.134E-03
7.486E 01	2.069E-03	4.090E 02	2.880E-03	3.123E-03
7.486E 01	6.341E-01	4.096E 02	2.779E-03	2.822E-03
7.771E 01	1.479E 00	4.111E 02	2.870E-03	4.903E-03
8.161E 01	1.929E 00	4.130E 02	2.849E-03	4.812E-03
8.442E 01	9.384E-01	4.140E 02	2.809E-03	4.161E-03
8.728E 01	4.095E-01	4.144E 02	2.847E-03	5.368E-03
8.728E 01	0.000	4.144E 02	2.847E-03	5.390E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 968. (LBF)  
 MEASURED THRUST..... 1054. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1895. (LBF=SEC/LBF)  
 MEASURED SPECIFIC IMPULSE..... 1863. (LBF=SEC/LBF)  
 CALCULATED THRUST COEFFICIENT..... 0.3900  
 MEASURED THRUST COEFFICIENT..... 0.4449

REGENERATIVE=COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 6102. (LBF)  
 NET THRUST..... 2156. (LBF)  
 SPECIFIC IMPULSE..... 2156. (LBF=SEC/LBF)  
 THRUST COEFFICIENT..... 0.4436

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9868  
 ADDITIVE DRAG COEFFICIENT..... 0.0009  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1604  
 DELTA P12..... 0.1183 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3701  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1627  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8903  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9041  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9370  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8892  
 ENTHALPY AT P0 = SUPERSONIC..... 31.24 (BTU/LBF)  
 ENTHALPY AT P0 = SUBSONIC..... 29.99 (BTU/LBF)

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 111.5 (LBF)  
 INLET MOMENTUM CHANGE..... -750.1 (LBF)  
 COMBUSTOR FRICTION DRAG..... 260.7 (LBF)  
 COMBUSTOR STRUT DRAG..... -12.09 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 619. (LBF)  
 NOZZLE FRICTION DRAG..... 42.37 (LBF)  
 NOZZLE STRUT DRAG..... -0.90 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1103. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1195. (LBF)  
 EXTERNAL FRICTION DRAG..... 48.96 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1091. (LBF)  
 TOTAL EXTERNAL DRAG..... -1090. (LBF)  
 TOTAL STRUT DRAG..... -12.09 (LBF)  
 CAVITY FORCE..... -901. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1103. (LBF)  
 MEASURED LOAD CELL FORCE..... -1017. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0. -16332.

## COMBUSTOR

FUEL/AIR RATIO..... 0.0191  
 EQUIVALENCE RATIO..... 0.975  
 COMBUSTOR EFFICIENCY..... 0.898  
 TOTAL PRESSURE RATIO..... 0.1408  
 COMBUSTOR EFFECTIVENESS..... 0.7951  
 INJECTOR DISCHARGE COEFFICIENTS 0.8234, 0.6651, 0.7772.

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C0..... 0.9546  
 NOZZLE COEFFICIENT = C1..... 0.6790  
 PROCESS EFFICIENCY..... 0.8829  
 KINETIC ENERGY EFFICIENCY..... 0.8984

## STATIONS

NOMINAL CONE LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3089 (IN)  
 INLET THROAT..... 40.400 (IN)  
 CONE LEADING EDGE..... 35.193 (IN)  
 NOZZLE SHOULD TRAILING EDGE..... 73.933 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.289 (IN)  
 STRUT LEADING EDGE..... 56.449 (IN)  
 STRUT TRAILING EDGE..... 65.049 (IN)  
 COMBUSTOR EXIT..... 65.044 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.294	B
1C	44.300	
2A	48.769	
2C	46.250	E
3A	54.059	
3B	56.244	
4	44.794	

Reading 57

$t = 287,81 \text{ sec,}$

READING = 0057 BLOCK = 101 TIME = 287.813 NALM 0.0 PI = 744.999 II = 2921.6  
RAHJET PERFORMANCE

Reg. con.

S U M M A R Y R E P O R T

P	T	M	S	GANT	MLMT	SONV	MACH	VEL	S	A/A	A	AVAC	0	IVAC	PMI	ETAC
WIND TUNNEL	1	U	5													
0.000	744.999	2862	663.9( 769)	1.2933	26.966	2573										
0.000	0.386	403	332.1( 97)	1.3989	26.965	964	5.947	5402	1.826	0.10585	26.736	0.9861	5002	9.708	187.1	
SPINE TIP N8	2	U	5													
0.600	17.025	2862	663.9( 789)	1.2932	26.965	2573										
0.600	16.073	2812	643.0( 769)	1.2954	26.965	2545	0.402	1023	2.082	0.10585	26.736	0.9861	4910	1.683	183.7	
WIND TUNNEL	3	U	0													
0.000	744.999	2862	663.9( 789)	1.2933	26.966	2573										
0.000	0.374	400	333.0( 96)	1.3968	26.965	980	6.029	5905	1.826	0.10347	26.135	0.9861	4891	9.496	187.2	
SPINE TIP N8	4	U	0													
0.600	17.025	2862	663.9( 789)	1.2932	26.965	2573										
0.600	16.162	2816	645.1( 770)	1.2953	26.965	2546	0.391	996	2.082	0.10347	26.135	0.9861	4891	1.601	187.2	
INLET THROAT	5	U	4													
0.400	274.610	2928	647.8( 773)	1.2950	26.966	2581										
0.400	274.610	2928	647.8( 773)	1.2950	26.966	2581										
INLET UPNRSK	6	U	3													
0.400	13.026	1910	218.4( 387)	1.3230	26.965	1810	2.561	4636	1.889	0.83182	26.736	0.1225	4286	61.365	160.3	
INLET DNRSK	7	U	4													
0.400	121.197	2928	647.8( 773)	1.2950	26.966	2581										
COMBUSTOR	8	U	21													
0.400	103.791	2926	617.2( 743)	1.2982	26.966	2510	0.493	1238	1.945	0.83182	26.736	0.1225	4286	16.382	160.3	
0.400	226.408	2992	651.2( 797)	1.2973	27.661	2597										
0.400	12.087	1926	218.8( 388)	1.3534	27.661	1863	2.498	4652	1.974	0.94034	26.636	0.1114	4242	67.981	158.1	0.11 0.07
COMBUSTOR	9	U	21													
0.400	170.688	2928	654.1( 804)	1.3009	26.967	2619										
0.400	19.363	1969	297.9( 451)	1.3622	26.669	2043	2.066	4222	2.044	0.94499	26.913	0.1112	4088	61.997	151.9	0.20 0.04
COMBUSTOR	10	U	21													
0.400	176.530	2791	654.0( 793)	1.3026	26.631	2609										
0.400	19.843	1932	298.6( 440)	1.3403	26.631	2024	2.084	4217	2.038	0.94327	26.913	0.1112	4087	61.989	151.9	0.20 0.01
COMBUSTOR	11	U	21													
0.400	174.736	2785	653.7( 792)	1.3029	26.625	2603										
0.400	20.146	1942	303.4( 444)	1.3419	26.625	2030	2.062	4186	2.038	0.94631	26.913	0.1110	4075	61.568	151.4	0.20 0.00
COMBUSTOR	12	U	21													
0.400	169.795	2782	653.0( 791)	1.3030	26.625	2602										
0.400	22.257	1958	319.1( 459)	1.3414	26.624	2060	1.984	4088	2.040	0.94633	26.913	0.1110	4052	60.114	150.6	0.20 0.00
COMBUSTOR	13	U	4													
0.400	118.868	3105	646.6( 888)	1.2876	26.995	2714										
0.400	37.471	2379	414.6( 660)	1.3119	26.996	2397	1.421	3407	2.093	0.93747	26.913	0.1121	3925	49.630	145.9	0.20 0.32
COMBUSTOR	14	U	7													
0.400	104.064	3276	633.0( 939)	1.2788	27.234	2765										
0.400	62.134	2922	516.4( 826)	1.2908	27.235	2624	0.920	2415	2.112	0.90485	26.913	0.1161	3868	33.954	143.7	0.20 0.52
COMBUSTOR	15	U	3													
0.400	103.975	3257	631.0( 933)	1.2796	27.219	2759										
0.400	63.186	2919	519.5( 825)	1.2911	27.221	2623	0.900	2362	2.111	0.90355	26.913	0.1163	3863	33.163	143.6	0.20 0.50
COMBUSTOR	16	U	3													
0.400	103.741	3201	628.8( 916)	1.2821	27.173	2740										
0.400	66.209	2996	528.8( 819)	1.2925	27.174	2617	0.855	2238	2.107	0.89989	26.913	0.1168	3852	31.297	143.1	0.20 0.47
COMBUSTOR	17	U	0													
0.400	103.710	3200	625.7( 916)	1.2822	27.173	2740										
0.400	66.204	2995	528.7( 819)	1.2925	27.174	2617	0.855	2237	2.107	0.89962	26.913	0.1168	3852	31.279	143.1	0.20 0.47
COMBUSTOR	18	U	21													
0.400	94.808	2992	655.6( 913)	1.3098	22.111	2816										
0.400	65.150	2461	568.8( 827)	1.3175	22.111	2700	0.772	2085	2.403	0.86345	27.397	0.1239	3842	27.974	140.2	0.74 0.07

READING = 0057 BLOCK = 101 TIME = 207.013 RUN = 0.00 FI = 744.994 TI = 2401.0

	P	T	M	GAMMA	MLWT	SONY	MACH	VEL	S	M/A	M	A/AC	MUMIM	Q	IYAC	PHI	ETAC
COMBUSTOR	0	19	12	6													
46.260	97.968	2468	655.5	( 833 )	1.3200	21.921	2718										
46.260	65.143	2233	568.6	( 747 )	1.3280	21.921	2594	0.804	2085	2.373	0.86298	27.397	0.1239	3844	27.969	140.3	0.74 0.01
COMBUSTOR	0	20	13	4													
47.310	95.077	2657	642.1	( 900 )	1.3109	22.111	2798										
47.310	64.375	2420	553.2	( 812 )	1.3189	22.111	2679	0.787	2109	2.398	0.80302	27.397	0.1332	3993	26.325	145.7	0.74 0.07
COMBUSTOR	0	21	14	2													
47.333	95.051	2659	641.8	( 901 )	1.3108	22.114	2799										
47.333	64.308	2422	552.7	( 812 )	1.3188	22.114	2680	0.788	2112	2.398	0.80269	27.397	0.1333	3994	26.331	145.8	0.74 0.07
COMBUSTOR	0	22	15	4													
48.110	90.291	2984	632.8	(1017)	1.2955	22.421	2928										
48.110	54.355	2653	508.1	( 892 )	1.3069	22.421	2773	0.908	2517	2.435	0.74836	27.397	0.1430	4134	29.273	150.9	0.74 0.18
COMBUSTOR	0	23	16	4													
48.783	86.245	3197	626.1	(1094)	1.2852	22.632	3004										
48.783	40.522	2693	431.2	( 903 )	1.3023	22.633	2776	1.125	3123	2.456	0.68830	27.397	0.1594	4272	33.407	153.9	0.74 0.25
COMBUSTOR	0	24	17	2													
49.313	86.199	3190	621.7	(1091)	1.2853	22.636	3001										
49.313	31.058	2526	365.5	( 841 )	1.3080	22.636	2694	1.327	3373	2.455	0.64373	27.397	0.1662	4325	35.749	159.2	0.74 0.28
COMBUSTOR	0	25	18	4													
50.723	80.081	3372	611.1	(1197)	1.2759	22.833	3081										
50.723	24.581	2586	308.2	( 860 )	1.3032	22.837	2709	1.442	3906	2.475	0.54863	27.397	0.1950	4553	33.299	166.2	0.74 0.31
COMBUSTOR	0	26	19	4													
52.823	72.056	3611	597.2	(1244)	1.2627	23.101	3133										
52.823	19.275	2708	240.5	( 900 )	1.2954	23.110	2787	1.538	4225	2.498	0.44967	27.397	0.2379	4772	29.522	174.2	0.74 0.40
COMBUSTOR	0	27	20	3													
53.323	71.526	3620	594.2	(1247)	1.2621	23.117	3135										
53.323	17.787	2671	220.0	( 886 )	1.2965	23.126	2788	1.586	4327	2.499	0.43129	27.397	0.2480	4815	29.003	175.7	0.74 0.40
COMBUSTOR	0	28	21	4													
54.073	68.800	3699	590.0	(1276)	1.2574	23.207	3157										
54.073	16.794	2728	204.0	( 905 )	1.2932	23.219	2748	1.599	4395	2.507	0.40655	27.397	0.2631	4874	27.765	177.9	0.74 0.43
COMBUSTOR	0	29	22	4													
54.833	66.584	3764	585.8	(1300)	1.2534	23.283	3174										
54.833	15.781	2766	186.9	( 918 )	1.2909	23.298	2760	1.619	4468	2.513	0.38445	27.397	0.2782	4929	26.694	179.9	0.74 0.46
COMBUSTOR	0	30	23	4													
55.760	65.112	3800	581.1	(1313)	1.2511	23.332	3183										
55.760	14.348	2752	161.6	( 912 )	1.2907	23.349	2750	1.666	4582	2.516	0.36093	27.397	0.2964	4991	25.700	182.2	0.74 0.47
COMBUSTOR	0	31	24	5													
56.258	50.593	4209	578.7	(1465)	1.2224	23.771	3280										
56.258	13.574	3258	169.6	(1094)	1.2653	23.829	2833	1.543	4585	2.558	0.29071	27.397	0.3679	5132	20.442	187.3	0.74 0.62
COMBUSTOR	0	32	25	5													
56.313	60.590	3792	578.5	(1310)	1.2512	23.330	3180										
56.313	10.005	2574	95.5	( 846 )	1.2970	23.347	2666	1.844	4916	2.522	0.28989	27.397	0.3690	5136	22.148	187.5	0.74 0.47
COMBUSTOR	0	33	26	3													
56.453	60.502	3796	577.6	(1312)	1.2509	23.336	3181										
56.453	9.936	2572	92.3	( 845 )	1.2970	23.354	2665	1.850	4929	2.522	0.28780	27.397	0.3717	5143	22.047	187.7	0.74 0.48
COMBUSTOR	0	34	27	6													
56.533	51.758	4103	577.5	(1455)	1.2245	23.746	3275										
56.533	13.147	3195	156.1	(1070)	1.2662	23.800	2909	1.578	4592	2.555	0.29103	27.397	0.3675	5148	20.769	187.9	0.74 0.61
COMBUSTOR	0	35	28	3													
56.813	52.681	4158	576.2	(1466)	1.2263	23.723	3269										
56.813	12.712	3137	143.7	(1049)	1.2709	23.773	2888	1.611	4692	2.552	0.29008	27.397	0.3688	5162	20.972	188.4	0.74 0.60
COMBUSTOR	0	36	29	3													
57.039	53.659	4120	575.2	(1453)	1.2285	23.693	3262										
57.039	12.314	3075	132.6	(1026)	1.2737	23.740	2864	1.643	4706	2.549	0.28952	27.397	0.3695	5173	21.175	188.8	0.74 0.59
COMBUSTOR	0	37	30	4													
57.763	56.493	4026	572.0	(1397)	1.2358	23.591	3238										
57.763	11.037	2877	100.2	( 953 )	1.2826	23.627	2787	1.744	4859	2.539	0.28504	27.397	0.3753	5198	21.524	189.7	0.74 0.56

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READING = 0097 BLOCK = 101 TIME = 207.015 MACH 0.0 PT = 744.999 IT = 2001.0

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	"	A/VAC	MUMTM	Q	IVAC	PMI	ETAC
COMBUSTOR	0	30	31	7													
58.783	96.074	3313	568.3	(1133)	1.2777	22.880	3033										
58.783	0.112	1733	-14.0	(553)	1.3352	26.005	2242	2.419	5424	2.450	0.244321	27.597	0.3777	5210	23.071	190.2	0.74 0.33
COMBUSTOR	0	34	32	6													
60.793	54.343	4164	561.8	(1453)	1.2243	23.788	3272										
60.793	12.650	3139	117.0	(1048)	1.2700	23.043	2803	1.635	4713	2.548	0.29307	27.397	0.3650	5106	21.460	189.7	0.74 0.62
COMBUSTOR	0	40	33	5													
62.213	48.397	4051	557.1	(11630)	1.1071	24.325	3359										
62.213	10.194	3960	213.0	(1350)	1.2207	24.476	3137	1.321	4105	2.574	0.30101	27.397	0.3553	5105	19.389	189.3	0.74 0.82
COMBUSTOR	0	41	34	4													
64.677	44.309	4750	548.4	(11669)	1.1769	24.471	3373										
64.677	19.259	4195	245.0	(11442)	1.2031	24.650	3191	1.221	3896	2.582	0.28532	27.397	0.3749	5107	17.276	189.6	0.74 0.88
COMBUSTOR	0	42	35	4													
65.053	41.082	4792	547.0	(11682)	1.1727	24.515	3376										
65.053	18.617	4271	257.4	(11471)	1.1963	24.704	3207	1.187	3807	2.589	0.26526	27.397	0.4032	5104	15.092	189.3	0.74 0.90
COMBUSTOR	0	43	36	3													
65.053	41.082	4912	632.5	(1732)	1.1658	24.424	3414										
65.053	20.237	4460	363.6	(11547)	1.1835	24.632	3264	1.124	3608	2.607	0.26526	27.397	0.4032	5212	15.120	190.3	0.74 0.90
NOZZLE	AE	44	37	5													
87.289	41.082	4792	547.0	(11686)	1.1727	24.515	3376										
87.289	18.203	2511	248.0	(1798)	1.2814	24.637	2538	2.825	7170	2.589	0.05522	27.397	1.9371	6702	0.153	244.6	0.74 0.90
NOZZLE	PU	45	38	5													
87.289	41.082	4792	547.0	(11643)	1.1727	24.515	3376										
87.289	0.386	1941	-881.9	(598)	1.3041	25.037	2251	3.484	7842	2.589	0.02506	27.397	4.2679	7100	3.054	259.1	0.74 0.90
NOZZLE	AE	46	39	5													
87.289	41.082	4912	632.5	(1732)	1.1658	24.424	3414										
87.289	1.255	2658	-826.1	(852)	1.2759	24.836	2606	2.793	7278	2.607	0.05522	27.397	1.9371	6820	0.246	248.9	0.74 0.90
NOZZLE	PU	47	40	5													
87.289	41.082	4912	632.5	(1732)	1.1658	24.424	3414										
87.289	0.386	2043	-846.9	(633)	1.2997	24.837	2305	3.471	8001	2.607	0.02430	27.397	4.4019	7248	3.022	264.6	0.74 0.90
FICTIVE	COMBUSTOR	67	60	0													
65.053	274.010	5124	547.0	(1808)	1.1797	24.697	3474										
65.053	0.386	1340	-1004.4	(395)	1.3333	25.203	1877	4.693	8811	2.437	0.04139	27.397	2.5645	7796	5.667	283.2	0.74 1.00
FICTIVE	NOZZLE	68	61	0													
87.289	25.602	4721	523.4	(1654)	1.1694	24.498	3347										
87.289	1.505	2882	-342.2	(934)	1.2871	24.834	2704	2.434	6581	2.623	0.05522	27.397	1.9371	6351	5.648	231.8	0.74 0.90

C.4 290

XARS	P-JR	P-OB	PDA	BOX	WIB	Q-OB	CANALL	P-IR/PS0	P-IR/PT0	P-OB/PS0	P-OB/PT0
6.901E-01	1.070E 00	0.000	-4.344E-01	0.000	0.000	0.000	2.470E-02	2.772E 00	1.436E-03	0.000	0.000
1.836E 01	1.070E 00	0.000	-3.561E 01	0.000	0.000	0.000	1.634E 02	2.772E 00	1.436E-03	0.000	0.000
3.070E 01	2.235E 00	0.000	-1.696E 02	0.000	0.000	0.000	6.804E 02	5.791E 01	3.000E-03	0.000	0.000
3.508E 01	3.931E 00	0.000	-3.694E 02	0.000	0.000	0.000	6.804E 02	1.014E 01	5.277E-03	0.000	0.000
3.519E 01	3.931E 00	5.730E 00	-4.351E 02	0.000	0.000	0.000	6.804E 02	1.024E 01	5.303E-03	1.485E 01	7.691E-03
3.520E 01	3.932E 00	5.693E 00	-4.352E 00	0.000	0.000	0.000	6.804E 02	1.024E 01	5.305E-03	1.475E 01	7.641E-03
3.555E 01	4.015E 00	5.582E 00	-4.436E 02	0.000	0.000	0.000	7.210E 02	1.040E 01	5.305E-03	1.475E 00	4.728E-03
3.568E 01	3.978E 00	1.600E 00	-4.595E 02	-2.557E 02	-2.551E 02	0.000	7.528E 02	1.031E 01	5.340E-03	4.146E 00	2.148E-03
3.606E 01	3.955E 00	2.328E 00	-4.711E 02	-2.586E 02	-2.586E 02	0.000	7.730E 02	1.025E 01	5.309E-03	6.031E 00	3.124E-03
3.698E 01	4.166E 00	3.877E 00	-4.928E 00	-2.649E 02	-2.649E 02	0.000	8.166E 02	1.079E 01	5.591E-03	1.005E 01	5.204E-03
3.701E 01	4.180E 00	5.633E 00	-5.191E 02	-2.839E 02	-2.733E 02	-1.006E 01	8.725E 02	1.083E 01	5.611E-03	1.511E 01	7.830E-03
3.732E 01	4.065E 00	6.987E 00	-5.325E 02	-2.926E 02	-2.789E 02	-1.420E 01	9.062E 02	1.053E 01	5.456E-03	1.810E 01	9.379E-03
3.803E 01	3.805E 00	1.274E 01	-5.489E 01	-3.125E 02	-2.905E 02	-2.192E 02	9.835E 02	9.859E 00	5.107E-03	3.301E 01	1.710E-02
3.834E 01	5.112E 00	1.629E 01	-5.473E 02	-2.232E 02	-2.969E 02	-2.534E 01	1.018E 03	1.325E 01	6.862E-03	3.961E 01	2.052E-02
3.875E 01	6.814E 00	1.487E 01	-5.465E 02	-3.374E 02	-3.077E 02	-2.970E 02	1.084E 03	1.765E 01	9.146E-03	3.852E 01	1.995E-02
3.891E 01	7.076E 00	1.480E 01	-5.464E 02	-3.400E 02	-3.095E 02	-3.037E 01	1.072E 03	1.833E 01	9.498E-03	3.635E 01	1.987E-02
3.901E 01	7.900E 00	1.235E 01	-5.451E 02	-3.445E 02	-3.161E 02	-3.246E 01	1.094E 03	2.047E 01	1.060E-02	3.976E 01	2.060E-02
3.932E 01	1.350E 01	1.621E 01	-5.489E 02	-3.637E 02	-3.279E 02	-3.575E 01	1.130E 03	3.499E 01	1.812E-02	4.201E 01	2.179E-02
3.936E 01	1.667E 01	1.238E 01	-5.567E 02	-3.731E 02	-3.358E 02	-3.759E 01	1.151E 03	4.321E 01	2.238E-02	3.209E 01	1.662E-02
3.991E 01	1.764E 01	5.625E 00	-5.803E 02	-3.914E 02	-3.505E 02	-4.078E 01	1.187E 03	4.623E 01	2.395E-02	1.457E 01	7.550E-03
4.001E 01	1.894E 01	4.034E 00	-5.991E 02	-4.033E 02	-3.607E 02	-4.265E 01	1.209E 03	4.804E 01	2.469E-02	1.045E 01	5.415E-03
4.001E 01	2.249E 01	1.375E 00	-6.369E 02	-4.245E 02	-3.788E 02	-4.578E 01	1.246E 03	5.828E 01	3.014E-02	1.563E 00	1.848E-03
4.004E 01	2.360E 01	1.624E 01	-6.488E 02	-4.308E 02	-3.839E 02	-4.662E 01	1.256E 03	6.114E 01	3.167E-02	4.207E 00	2.179E-03
4.041E 01	2.372E 01	1.152E 00	-6.500E 02	-4.315E 02	-3.845E 02	-4.698E 01	1.257E 03	6.147E 01	3.184E-02	4.281E 00	2.216E-03
4.106E 01	3.484E 01	4.186E 01	-7.859E 02	-5.240E 02	-4.413E 02	-6.345E 01	1.362E 03	9.054E 01	4.691E-02	1.085E 01	5.615E-03
4.131E 01	3.307E 01	4.214E 00	-7.875E 02	-5.263E 02	-4.422E 02	-6.411E 01	1.363E 03	9.087E 01	4.708E-02	1.092E 01	5.675E-03
4.137E 01	3.589E 01	4.400E 00	-7.943E 02	-5.353E 02	-4.465E 02	-6.868E 01	1.371E 03	9.300E 01	4.818E-02	1.140E 01	5.908E-03
4.137E 01	3.750E 01	7.015E 00	-8.187E 02	-5.539E 02	-4.555E 02	-6.982E 01	1.386E 03	9.316E 01	5.034E-02	1.810E 01	9.416E-03
4.246E 01	2.675E 01	2.675E 01	-9.296E 02	-7.267E 02	-5.303E 02	-1.993E 02	1.501E 03	1.249E 02	6.468E-02	6.932E 01	5.591E-02
4.409E 01	6.033E 01	6.033E 01	-9.641E 02	-1.043E 03	-6.915E 02	-4.016E 02	1.499E 03	1.657E 02	8.583E-02	1.563E 02	8.098E-02
4.431E 01	6.074E 01	6.074E 01	-9.657E 02	-1.147E 03	-7.161E 02	-4.307E 02	1.725E 03	1.711E 02	8.664E-02	1.974E 02	8.152E-02
4.490E 01	6.166E 01	6.166E 01	-9.713E 02	-1.284E 03	-7.735E 02	-5.092E 02	1.785E 03	1.833E 02	9.498E-02	1.598E 02	8.275E-02
4.491E 01	6.167E 01	6.167E 01	-9.713E 02	-1.284E 03	-7.735E 02	-5.106E 02	1.786E 03	1.833E 02	9.495E-02	1.598E 02	8.275E-02
4.625E 01	6.592E 01	6.438E 01	-8.625E 02	-1.758E 03	-9.474E 02	-6.106E 02	1.863E 03	1.708E 02	8.648E-02	1.669E 02	8.641E-02
4.626E 01	6.599E 01	6.599E 01	-8.609E 02	-1.762E 03	-9.465E 02	-6.132E 02	1.864E 03	1.707E 02	8.644E-02	1.669E 02	8.641E-02
4.733E 01	6.238E 01	6.637E 01	-7.220E 02	-2.129E 03	-1.065E 03	-1.033E 03	2.094E 03	1.616E 02	8.373E-02	1.720E 02	8.908E-02
4.733E 01	6.220E 01	6.641E 01	-7.207E 02	-2.136E 03	-1.068E 03	-1.099E 03	2.097E 03	1.612E 02	8.350E-02	1.721E 02	8.912E-02
4.813E 01	5.637E 01	5.354E 01	-5.730E 02	-2.385E 03	-1.159E 03	-1.239E 03	2.194E 03	1.456E 02	7.540E-02	1.361E 02	7.052E-02
4.878E 01	4.052E 01	4.052E 01	-4.270E 02	-2.568E 03	-1.219E 03	-1.350E 03	2.278E 03	1.050E 02	5.439E-02	1.030E 02	5.439E-02
4.931E 01	3.106E 01	3.106E 01	-3.261E 02	-2.568E 03	-1.270E 03	-1.420E 03	2.345E 03	8.047E 01	4.169E-02	6.047E 01	4.169E-02
5.072E 01	2.458E 01	2.458E 01	-1.224E 02	-2.980E 03	-1.409E 03	-1.581E 03	2.322E 03	3.369E 01	3.299E-02	6.369E 01	3.299E-02
5.262E 01	1.927E 01	1.927E 01	-1.190E 02	-3.360E 03	-1.566E 03	-1.790E 03	2.789E 03	4.994E 01	2.587E-02	4.994E 01	2.587E-02
5.322E 01	1.779E 01	1.779E 01	-1.672E 02	-3.441E 03	-1.606E 03	-1.835E 03	2.952E 03	4.609E 01	2.587E-02	4.609E 01	2.587E-02
5.407E 01	1.799E 01	1.799E 01	2.341E 02	-3.558E 03	-1.657E 03	-1.901E 03	3.048E 03	4.351E 01	2.388E-02	4.351E 01	2.388E-02
5.483E 01	1.579E 01	1.579E 01	2.973E 02	-3.671E 03	-1.706E 03	-1.955E 03	3.045E 03	4.091E 01	2.119E-02	4.091E 01	2.119E-02
5.572E 01	1.435E 01	1.435E 01	3.673E 02	-3.860E 03	-1.761E 03	-2.009E 03	3.185E 03	3.517E 01	1.926E-02	3.517E 01	1.926E-02
5.626E 01	1.357E 01	1.357E 01	5.119E 02	-3.860E 03	-1.787E 03	-2.079E 03	3.209E 03	3.517E 01	1.822E-02	3.517E 01	1.822E-02
5.631E 01	6.600E 00	1.499E 01	5.197E 02	-3.873E 03	-1.788E 03	-2.038E 03	3.216E 03	1.710E 01	8.659E-03	3.495E 01	1.811E-02
5.645E 01	6.600E 00	1.227E 01	5.244E 02	-3.890E 03	-1.799E 03	-2.094E 03	3.234E 03	1.710E 01	8.659E-03	3.495E 01	1.811E-02
5.653E 01	1.315E 01	1.315E 01	5.297E 02	-3.900E 03	-1.799E 03	-2.100E 03	3.245E 03	3.407E 01	1.765E-02	3.407E 01	1.765E-02
5.681E 01	1.271E 01	1.271E 01	5.466E 02	-3.934E 03	-1.812E 03	-2.122E 03	3.280E 03	3.294E 01	1.706E-02	3.294E 01	1.706E-02
5.708E 01	1.231E 01	1.231E 01	5.588E 02	-3.962E 03	-1.822E 03	-2.140E 03	3.309E 03	3.191E 01	1.653E-02	3.191E 01	1.653E-02
5.776E 01	1.104E 01	1.104E 01	5.904E 02	-3.962E 03	-1.851E 03	-2.198E 03	3.309E 03	2.660E 01	1.482E-02	2.660E 01	1.482E-02
5.879E 01	6.112E 00	6.112E 00	6.103E 02	-3.962E 03	-1.885E 03	-2.266E 03	3.322E 03	1.584E 01	8.205E-03	1.584E 01	8.205E-03
6.079E 01	1.265E 01	1.265E 01	6.125E 02	-3.962E 03	-1.942E 03	-2.369E 03	3.390E 03	3.276E 01	1.698E-02	3.276E 01	1.698E-02
6.221E 01	1.819E 01	1.819E 01	6.125E 02	-3.962E 03	-1.977E 03	-2.441E 03	3.472E 03	4.714E 01	2.442E-02	4.714E 01	2.442E-02



XAB8	P-IB	P-OB	PDA	GOA	G-IR	O-OB	CAMALL	P-IR/P90	P-IR/PT0	P-OB/PS0	P-OB/PT0
6.468E 01	1.926E 01	1.926E 01	6.125E 02	-4.677E 03	-2.046E 03	-2.651E 03	4.289E 03	4.990E 01	2.505E-02	4.990E 01	2.505E-02
6.505E 01	1.781E 01	1.942E 01	6.125E 02	-4.735E 03	-2.057E 03	-2.678E 03	4.337E 03	4.615E 01	2.391E-02	5.032E 01	2.607E-02
6.509E 01	1.761E 01	1.944E 01	6.125E 02	-4.735E 03	-2.058E 03	-2.680E 03	4.342E 03	4.615E 01	2.391E-02	5.037E 01	2.607E-02
6.529E 01	1.711E 01	1.952E 01	6.125E 02	-4.755E 03	-2.065E 03	-2.691E 03	4.368E 03	4.434E 01	2.297E-02	5.059E 01	2.621E-02
6.695E 01	1.129E 01	7.970E 00	7.674E 02	-4.818E 03	-2.107E 03	-2.771E 03	4.563E 03	2.925E 01	1.513E-02	2.065E 01	1.070E-02
6.762E 01	8.172E 00	9.937E 00	9.566E 02	-4.930E 03	-2.121E 03	-2.809E 03	4.665E 03	2.117E 01	1.097E-02	2.575E 01	1.330E-02
6.839E 01	4.590E 00	7.972E 00	1.162E 03	-4.992E 03	-2.134E 03	-2.857E 03	4.760E 03	1.189E 01	6.161E-03	1.962E 01	1.016E-02
6.911E 01	3.534E 00	5.360E 00	1.286E 03	-5.007E 03	-2.145E 03	-2.902E 03	4.848E 03	9.158E 00	4.744E-03	1.389E 01	7.195E-03
6.937E 01	2.640E 00	4.459E 00	1.381E 03	-5.091E 03	-2.152E 03	-2.939E 03	4.922E 03	6.840E 00	3.544E-03	1.155E 01	5.985E-03
7.067E 01	1.893E 00	3.055E 00	1.476E 03	-5.152E 03	-2.160E 03	-2.992E 03	5.036E 03	4.905E 00	2.541E-03	7.916E 00	4.101E-03
7.110E 01	1.555E 00	2.790E 00	1.506E 03	-5.176E 03	-2.163E 03	-3.013E 03	5.088E 03	4.029E 00	2.087E-03	4.780E 00	3.744E-03
7.263E 01	1.127E 00	1.845E 00	1.591E 03	-5.240E 03	-2.172E 03	-3.068E 03	5.273E 03	2.920E 00	1.513E-03	4.780E 00	3.744E-03
7.378E 01	1.085E 00	1.637E 00	1.597E 03	-5.255E 03	-2.173E 03	-3.072E 03	5.290E 03	2.811E 00	1.456E-03	4.243E 00	2.168E-03
7.353E 01	1.007E 00	6.000E-01	1.634E 03	-5.271E 03	-2.177E 03	-3.094E 03	5.374E 03	2.610E 00	1.352E-03	1.555E 00	8.054E-04
7.354E 01	1.007E 00	3.945E-01	1.635E 03	-5.271E 03	-2.177E 03	-3.094E 03	5.375E 03	2.609E 00	1.352E-03	1.540E 00	7.975E-04
7.486E 01	8.700E-01	0.000	1.655E 03	-5.344E 03	-2.184E 03	-3.140E 03	5.427E 03	2.254E 00	1.168E-03	0.000	0.000
7.771E 01	1.745E 00	0.000	1.707E 03	-5.356E 03	-2.196E 03	-3.140E 03	5.525E 03	4.521E 00	2.342E-03	0.000	0.000
8.161E 01	1.620E 00	0.000	1.779E 03	-5.399E 03	-2.209E 03	-3.140E 03	5.630E 03	4.197E 00	2.176E-03	0.000	0.000
8.442E 01	1.190E 00	0.000	1.810E 03	-5.361E 03	-2.222E 03	-3.140E 03	5.684E 03	3.083E 00	1.597E-03	0.000	0.000
8.728E 01	1.655E 00	0.000	1.845E 03	-5.362E 03	-2.242E 03	-3.140E 03	5.707E 03	4.288E 00	2.221E-03	0.000	0.000
8.729E 01	1.656E 00	0.000	1.845E 03	-5.362E 03	-2.242E 03	-3.140E 03	5.707E 03	4.291E 00	2.223E-03	0.000	0.000

HEADING = 0057 HLCCK = 181 TIME = 287.813 ACN 0.0 PT = 744.999 YI = 2951.4

X	DNMAG	CORAG	CF	MC
4.040E 01	1.117E 02	1.117E 02	2.218E-03	4.364E-02
4.041E 01	1.881E-01	1.119E 02	2.521E-03	3.544E-02
4.130E 01	1.758E 01	1.295E 02	2.433E-03	4.734E-02
4.131E 01	1.800E-01	1.297E 02	2.454E-03	4.946E-02
4.137E 01	1.169E 00	1.309E 02	2.435E-03	5.106E-02
4.150E 01	2.259E 00	1.131E 02	2.455E-03	5.422E-02
4.246E 01	1.596E 01	1.491E 02	2.608E-03	6.973E-02
4.409E 01	2.296E 01	1.720E 02	2.953E-03	7.258E-02
4.431E 01	2.653E 00	1.747E 02	3.042E-03	6.982E-02
4.480E 01	5.865E 00	1.805E 02	3.041E-03	6.905E-02
4.481E 01	9.207E-02	1.808E 02	3.025E-03	6.948E-02
4.625E 01	1.704E 01	1.977E 02	3.466E-03	6.099E-02
4.626E 01	1.107E-01	1.978E 02	2.988E-03	7.366E-02
4.733E 01	1.014E 01	2.079E 02	2.788E-03	7.649E-02
4.733E 01	2.157E-01	2.081E 02	2.899E-03	7.339E-02
4.811E 01	7.666E 00	2.158E 02	2.796E-03	7.483E-02
4.878E 01	7.426E 00	2.232E 02	2.832E-03	6.593E-02
4.931E 01	6.542E 00	2.298E 02	2.860E-03	5.719E-02
5.072E 01	1.719E 01	2.470E 02	2.750E-03	5.012E-02
5.282E 01	2.294E 01	2.699E 02	2.736E-03	4.165E-02
5.332E 01	5.204E 00	2.751E 02	2.846E-03	3.796E-02
5.407E 01	7.702E 00	2.828E 02	2.823E-03	3.638E-02
5.463E 01	7.505E 00	2.903E 02	2.838E-03	3.440E-02
5.576E 01	8.642E 00	2.992E 02	2.839E-03	3.193E-02
5.626E 01	2.923E 00	3.021E 02	2.813E-03	2.887E-02
5.631E 01	4.343E-01	3.025E 02	2.977E-03	2.282E-02
5.645E 01	1.126E 00	3.037E 02	2.755E-03	2.409E-02
5.653E 01	6.606E-01	3.043E 02	3.274E-03	2.471E-02
5.681E 01	2.320E 00	3.067E 02	2.959E-03	2.643E-02
5.704E 01	1.791E 00	3.084E 02	2.937E-03	2.607E-02
5.776E 01	5.768E 00	3.102E 02	2.895E-03	2.453E-02
5.878E 01	8.482E 00	3.227E 02	2.823E-03	1.683E-02
6.079E 01	1.552E 01	3.382E 02	2.479E-03	3.047E-02
6.221E 01	1.016E 01	3.484E 02	2.982E-03	3.203E-02
6.468E 01	1.793E 01	3.663E 02	3.206E-03	4.988E-02
6.505E 01	2.586E 00	3.680E 02	3.299E-03	2.804E-02
6.509E 01	2.694E-01	3.691E 02	3.388E-03	2.855E-02
6.529E 01	1.348E 00	3.705E 02	3.390E-03	2.843E-02
6.695E 01	1.137E 01	3.819E 02	3.273E-03	2.077E-02
6.762E 01	4.195E 00	3.861E 02	3.255E-03	1.948E-02
6.839E 01	4.502E 00	3.904E 02	3.199E-03	1.555E-02
6.911E 01	3.631E 00	3.942E 02	3.156E-03	1.258E-02
6.972E 01	2.693E 00	3.969E 02	3.126E-03	1.074E-02
7.067E 01	3.579E 00	4.005E 02	3.077E-03	8.266E-03
7.110E 01	1.417E 00	4.019E 02	3.060E-03	7.509E-03
7.263E 01	4.340E 00	4.062E 02	3.008E-03	5.639E-03
7.278E 01	3.509E-01	4.064E 02	2.995E-03	5.127E-03
7.353E 01	1.431E 00	4.080E 02	2.921E-03	3.506E-03
7.354E 01	2.285E-03	4.080E 02	2.920E-03	3.446E-03
7.406E 01	7.501E-01	4.088E 02	2.924E-03	3.719E-03
7.771E 01	1.844E 00	4.106E 02	3.001E-03	6.304E-03
8.161E 01	2.336E 00	4.129E 02	2.970E-03	5.918E-03
8.442E 01	1.077E 00	4.144E 02	2.916E-03	4.655E-03
8.728E 01	4.483E-01	4.145E 02	2.947E-03	5.957E-03
8.729E 01	0.000	4.145E 02	2.947E-03	5.460E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST..... 13.7 (LBF)  
 MEASURED THRUST..... 14.6 (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 2037 (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2108 (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5017  
 MEASURED THRUST COEFFICIENT..... 0.5017  
 REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED  
 STREAM THRUST..... 6482 (LBF)  
 NET THRUST..... 1458 (LBF)  
 SPECIFIC IMPULSE..... 2206 (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.5986  
 ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9861  
 ADDITIVE DRAG COEFFICIENT..... 0.0004  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1603  
 DELTA PT2..... 0.1184 (P81)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3686  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1627  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8906  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9042  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9351  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8875  
 ENTHALPY AT P0 = SUPERSONIC..... -1.02 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 30.09 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO..... 0.0247  
 EQUIVALENCE RATIO..... 0.744  
 COMBUSTOR EFFICIENCY..... 0.902  
 TOTAL PRESSURE RATIO..... 0.1496  
 COMBUSTION EFFECTIVENESS..... 0.8126  
 INJECTOR DISCHARGE COEFFICIENTS 0.8111 0.5859 0.7750

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9478  
 NOZZLE COEFFICIENT = C7..... 0.6676  
 PROCESS EFFICIENCY..... 0.8669  
 KINETIC ENERGY EFFICIENCY..... 0.8821

STATIONS

NOMINAL COWL LEADING EDGE..... 30.084 (IN)  
 SPIKE TRANSLATION..... 0.3124 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.197 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.537 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.284 (IN)  
 STRUT LEADING EDGE..... 56.453 (IN)  
 STRUT TRAILING EDGE..... 65.054 (IN)  
 COMBUSTION EXIT..... 65.054 (IN)

FUEL INJECTORS

INJECTORS  
 1A  
 1B  
 1C  
 2A  
 2C  
 3A  
 3B  
 4  
 STATION  
 40.400  
 41.298  
 44.300  
 46.773  
 46.250  
 54.063  
 56.248  
 44.798  
 VALVE  
 A  
 B  
 E

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 111.7 (LBF)  
 INLET MOMENTUM CHANGE..... -760.5 (LBF)  
 COMBUSTOR FRICTION DRAG..... 257.1 (LBF)  
 COMBUSTOR STRUT DRAG..... 1.85 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 921 (LBF)  
 NOZZLE FRICTION DRAG..... 48.60 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1187 (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1232 (LBF)  
 EXTERNAL FRICTION DRAG..... 63.78 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1059 (LBF)  
 TOTAL EXTERNAL DRAG..... -1122 (LBF)  
 TOTAL STRUT DRAG..... 1.85 (LBF)  
 CAVITY FORCE..... -1234 (LBF)  
 CALCULATED LOAD CELL FORCE..... -1009 (LBF)  
 MEASURED LOAD CELL FORCE..... -909 (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE 0.0 -108.0

Reading 60

$t = 155.69 \text{ sec.}$

03/04/75  
PAGE 1

READING # 0060 BLOCK # 55 TIME # 155.693 MACH 6.0 PT # 747.249 TT # 2950.4  
RAMJET PERFORMANCE

SUMMARY REPORT

	P	T	H	S	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/VAC	MOMTM	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5															
0.000	747.249	2950	684.51	780	1.2943	28.966	2560											
0.000	0.363	397	33.71	45	1.3988	28.965	976	6.013	5868	1.822	0.10609	26.784	0.9856	4982	9.673	186.0		
SPRIKE TIP N8	2	0	5															
0.600	16.050	2950	684.51	780	1.2942	28.965	2560											
0.600	16.336	2884	634.91	760	1.2963	28.965	2533	0.394	999	2.078	0.10609	26.784	0.9856	4956	1.647	185.1		
WIND TUNNEL	3	0	0															
0.000	747.249	2950	684.51	780	1.2943	28.966	2560											
0.000	0.379	396	33.91	45	1.3988	28.965	975	6.022	5869	1.822	0.10543	26.615	0.9856	4951	9.616	186.0		
SPRIKE TIP N8	4	0	0															
0.600	16.050	2950	684.51	780	1.2942	28.965	2560											
0.600	16.362	2885	634.91	761	1.2963	28.965	2534	0.391	992	2.078	0.10543	26.615	0.9856	4951	1.625	186.0		
INLET THROAT	5	0	4															
0.400	273.354	2924	646.51	772	1.2951	28.966	2549											
0.400	14.051	1415	219.61	349	1.2927	28.965	1813	2.849	4681	1.888	0.85980	26.784	0.1216	4284	61.784	160.0		
INLET DNRRK	7	0	4															
0.400	122.017	2924	646.51	772	1.2951	28.966	2550											
0.400	104.414	2822	615.81	742	1.2984	28.966	2508	0.494	1280	1.944	0.85980	26.784	0.1216	4284	16.562	160.0		
COMBUSTOR	8	0	1	4														
0.410	272.684	2924	646.51	772	1.2951	28.966	2549											
0.410	16.398	1474	235.31	343	1.2943	28.965	1848	2.459	4536	1.889	0.84566	26.784	0.1106	4240	66.660	158.3		
COMBUSTOR	9	0	2	4														
41.344	219.128	2916	644.11	770	1.2954	28.966	2546											
41.344	19.160	1628	276.31	403	1.2912	28.965	1936	2.218	4290	1.904	0.84650	26.784	0.1103	4113	63.109	153.6		
COMBUSTOR	10	3	4															
41.409	210.836	2915	643.91	770	1.2954	28.966	2546											
41.409	19.393	1639	279.31	403	1.2906	28.965	1942	2.200	4271	1.905	0.84750	26.784	0.1104	4104	62.897	153.2		
COMBUSTOR	11	4	4															
41.500	206.026	2914	643.61	769	1.2954	28.966	2546											
41.500	19.692	1654	283.51	412	1.2999	28.965	1950	2.177	4245	1.907	0.84732	26.784	0.1104	4091	62.498	152.7		
COMBUSTOR	12	5	5															
42.460	178.974	2902	639.91	760	1.2958	28.966	2541											
42.460	21.387	1742	307.31	430	1.2958	28.965	1999	2.051	4080	1.915	0.83889	26.784	0.1114	4006	59.526	149.6		
COMBUSTOR	13	6	5															
44.124	161.396	2878	632.51	758	1.2966	28.966	2531											
44.124	21.499	1773	315.91	425	1.2945	28.965	2015	1.975	3980	1.920	0.84046	26.784	0.1156	3950	55.949	147.5		
COMBUSTOR	14	7	5															
44.310	159.971	2875	631.71	758	1.2967	28.966	2530											
44.310	21.597	1778	317.11	426	1.2943	28.965	2018	1.967	3988	1.920	0.84367	26.784	0.1157	3943	55.728	147.2		
COMBUSTOR	15	8	4															
44.800	155.421	2868	629.71	760	1.2969	28.966	2527											
44.800	21.900	1792	321.01	450	1.2937	28.965	2025	1.940	3930	1.921	0.84033	26.784	0.1161	3923	54.987	146.5		
COMBUSTOR	16	9	4															
44.844	154.960	2867	629.31	759	1.2969	28.966	2526											
44.844	21.925	1793	321.41	450	1.2936	28.965	2026	1.938	3926	1.921	0.84980	26.784	0.1162	3921	54.904	146.4		
COMBUSTOR	17	10	5															
46.260	139.129	2849	624.11	750	1.2975	28.966	2519											
46.260	21.400	1819	328.41	457	1.2926	28.965	2040	1.886	3887	1.927	0.84845	26.784	0.1232	3878	50.724	144.8		
COMBUSTOR	18	11	5															
47.310	127.325	2837	620.41	747	1.2979	28.966	2514											
47.310	20.097	1822	329.21	458	1.2925	28.965	2041	1.870	3817	1.932	0.78926	26.784	0.1325	3800	46.822	144.1		

READING = 0060 BLOCK = 55 TIME = 155.693 MACH 6.0 PT = 747.249 TT = 2950.4

	P	T	M	S	GAMMA	MOLWT	SONV	MACH	VEL	W/A	W	A/C	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	5													
47.169	126.680	2836	620.2	7003	1.2979	28.966	2514										
47.369	19.997	1822	329.1	450	1.3325	28.965	2041	1.870	3817	1.932	0.78541	26.784	0.1331	3859	46.586	144.1	
COMBUSTOR	0	20	13	5													
48.110	119.917	2828	617.7	7403	1.2982	28.966	2510										
48.110	18.483	1805	324.6	4531	1.3332	28.965	2032	1.885	3830	1.935	0.73523	26.784	0.1422	3862	43.764	144.2	
COMBUSTOR	0	21	14	5													
48.819	114.321	2821	615.5	7423	1.2984	28.966	2507										
48.819	18.302	1765	313.6	4421	1.3348	28.965	2011	1.933	3887	1.937	0.67290	26.784	0.1554	3884	40.645	145.0	
COMBUSTOR	0	22	15	4													
48.349	111.246	2815	613.9	7403	1.2986	28.966	2505										
48.349	18.736	1729	303.8	4331	1.3364	28.965	1991	1.978	3939	1.939	0.62933	26.784	0.1662	3906	38.328	145.9	
COMBUSTOR	0	23	16	5													
50.759	102.624	2803	610.2	7371	1.2990	28.966	2500										
50.759	11.761	1659	284.7	4131	1.3397	28.965	1953	2.066	4036	1.983	0.53636	26.784	0.1950	3947	33.638	147.4	
COMBUSTOR	0	24	17	4													
52.859	91.629	2787	605.5	7321	1.2995	28.966	2493										
52.859	9.005	1585	264.9	3941	1.3433	28.965	1912	2.159	4128	1.989	0.43961	26.784	0.2379	3985	28.204	148.8	
COMBUSTOR	0	25	18	4													
53.359	90.085	2784	604.5	7311	1.2996	28.966	2492										
53.359	8.478	1566	259.6	3881	1.3443	28.965	1901	2.186	4154	1.950	0.42164	26.784	0.2480	3997	27.220	149.2	
COMBUSTOR	0	26	19	4													
54.109	87.827	2779	603.0	7301	1.2997	28.966	2490										
54.109	7.793	1539	252.6	3811	1.3458	28.965	1886	2.221	4188	1.951	0.39745	26.784	0.2631	4011	25.867	149.8	
COMBUSTOR	0	27	20	4													
54.869	85.595	2774	601.7	7281	1.2998	28.966	2488										
54.869	7.207	1516	246.3	3751	1.3470	28.965	1872	2.253	4217	1.952	0.37585	26.784	0.2782	4024	24.631	150.2	
COMBUSTOR	0	28	21	5													
55.760	82.943	2769	600.2	7271	1.3000	28.966	2486										
55.760	6.639	1493	240.3	3691	1.3483	28.965	1859	2.283	4244	1.954	0.35368	26.784	0.2957	4036	23.326	150.7	
COMBUSTOR	0	29	22	4													
56.294	71.580	2767	599.5	7261	1.3001	28.966	2485										
56.294	5.084	1446	227.9	3571	1.3509	28.965	1831	2.355	4312	1.964	0.28420	26.784	0.3679	4069	19.045	151.9	
COMBUSTOR	0	30	23	5													
56.349	71.503	2767	599.4	7261	1.3001	28.966	2485										
56.349	5.066	1445	227.6	3561	1.3510	28.965	1831	2.356	4313	1.964	0.28345	26.784	0.3689	4069	19.001	151.9	
COMBUSTOR	0	31	24	5													
56.489	71.261	2766	599.2	7261	1.3002	28.966	2484										
56.489	5.019	1442	226.9	3561	1.3511	28.965	1829	2.360	4316	1.964	0.28151	26.784	0.3715	4071	18.883	152.0	
COMBUSTOR	0	32	25	5													
56.569	72.171	2766	599.1	7261	1.3002	28.966	2484										
56.569	5.067	1441	226.5	3551	1.3512	28.965	1828	2.362	4318	1.963	0.28457	26.784	0.3675	4071	19.095	152.0	
COMBUSTOR	0	33	26	5													
56.849	72.318	2764	598.7	7251	1.3002	28.966	2484										
56.849	5.029	1437	225.4	3541	1.3515	28.965	1826	2.368	4322	1.963	0.28357	26.784	0.3688	4073	19.048	152.1	
COMBUSTOR	0	34	27	5													
57.075	72.490	2763	598.5	7251	1.3002	28.966	2483										
57.075	5.007	1434	224.6	3531	1.3517	28.965	1824	2.372	4325	1.963	0.28314	26.784	0.3693	4074	19.033	152.1	
COMBUSTOR	0	35	28	4													
57.799	72.171	2760	597.6	7241	1.3003	28.966	2482										
57.799	4.886	1425	222.2	3511	1.3522	28.965	1818	2.384	4334	1.963	0.27866	26.784	0.3753	4078	18.770	152.2	
COMBUSTOR	0	36	29	4													
58.819	72.318	2757	596.4	7231	1.3005	28.966	2481										
58.819	4.822	1417	220.1	3491	1.3527	28.965	1814	2.393	4340	1.962	0.27682	26.784	0.3777	4079	18.673	152.3	
COMBUSTOR	0	37	30	5													
60.829	73.597	2750	594.4	7211	1.3007	28.966	2478										
60.829	5.031	1422	221.5	3501	1.3523	28.965	1817	2.378	4320	1.960	0.28651	26.784	0.3650	4086	19.235	151.8	

	P	T	M	S	GAMMA	MOLWT	SONY	MACH	VEL	B	N/A	M	A/AC	MOMTH	B	IVAC	PHI	ETAC
COMBUSTOR	0	36	31	5														
62.249	74.532	2746	593.27	720	1.3008	28.966	2476											
62.349	5.206	1427	222.91	352	1.3520	28.965	1820	2.365	4304	1.954	0.29428	26.784	0.3553	4057	14.684	151.5		
COMBUSTOR	0	39	32	4														
64.713	69.014	2738	590.91	718	1.3010	28.966	2473											
64.713	4.997	1436	223.31	354	1.3515	28.965	1828	2.343	4277	1.963	0.27894	26.784	0.3749	4040	18.542	150.9		
COMBUSTOR	0	40	33	2														
65.089	63.933	2737	590.51	717	1.3011	28.966	2472											
65.089	4.654	1438	225.61	354	1.3514	28.965	1826	2.340	4273	1.968	0.25932	26.784	0.4032	4038	17.222	150.6		
NOZZLE	48	41	34	3														
67.325	63.933	2737	590.51	717	1.3011	28.966	2472											
67.325	0.411	742	49.61	178	1.3923	28.965	1332	3.907	5202	1.968	0.05398	26.784	1.9371	4835	4.365	169.3		
NOZZLE	P0	42	35	3														
67.325	63.933	2737	590.51	717	1.3011	28.966	2472											
67.325	0.263	727	46.11	175	1.3929	28.965	1319	3.958	5220	1.968	0.05148	26.784	2.0315	4544	4.176	169.7		
PCTIVE	COMBUSTOR	42	55	0														
65.089	273.354	2737	590.51	717	1.3011	28.966	2472											
65.089	0.383	481	-13.31	115	1.3891	28.965	1075	5.113	5497	1.869	0.08191	26.784	1.2766	4701	6.998	175.5		
PCTIVE	NOZZLE	63	56	0														
67.325	62.206	2712	593.31	710	1.3019	28.966	2462											
67.325	0.413	741	49.31	178	1.3924	28.965	1330	3.885	5169	1.968	0.05398	26.784	1.9371	4808	4.337	168.3		

READING = 0060 BLOCK = 55 TIME = 155.693 MACH 6.0 PT = 747.249 TT = 2950.4

XABS	P-18	P-OB	PDA	GOX	Q-18	Q-OB	CANALL	P-18/P80	P-18/PTO	P-OB/P80	P-OB/PTO
6.901E-01	1.060E 00	0.000	-4.396E-01	0.000	0.000	0.000	2.470E-02	2.770E 00	1.419E-03	0.000	0.000
1.060E 01	1.060E 00	0.000	-3.529E 01	0.000	0.000	0.000	1.634E 02	2.770E 00	1.419E-03	0.000	0.000
3.070E 01	2.175E 00	0.000	-1.664E 02	0.000	0.000	0.000	5.033E 02	5.684E 00	2.911E-03	0.000	0.000
3.508E 01	3.035E 00	0.000	-3.634E 02	0.000	0.000	0.000	6.804E 02	1.020E 01	5.223E-03	0.000	0.000
3.535E 01	3.022E 00	0.000	-4.313E 02	0.000	0.000	0.000	6.669E 02	1.025E 01	5.249E-03	1.484E 01	7.602E-03
3.553E 01	3.023E 00	5.680E 00	-4.313E 02	0.000	0.000	0.000	6.872E 02	1.025E 01	5.250E-03	1.475E 01	7.553E-03
3.555E 01	3.023E 00	5.644E 00	-4.303E 02	0.000	0.000	0.000	7.190E 02	1.036E 01	5.306E-03	9.770E 00	5.007E-03
3.590E 01	3.024E 00	1.650E 00	-4.552E 02	0.000	0.000	0.000	7.544E 02	1.025E 01	5.251E-03	4.312E 00	3.206E-03
3.606E 01	3.025E 00	2.122E 00	-4.645E 02	0.000	0.000	0.000	7.710E 02	1.021E 01	5.226E-03	6.069E 00	3.108E-03
3.608E 01	4.001E 00	4.074E 00	-4.654E 02	0.000	0.000	0.000	8.145E 02	1.021E 01	5.226E-03	1.065E 01	5.451E-03
3.701E 01	4.215E 00	4.283E 00	-5.107E 02	0.000	0.000	0.000	8.706E 02	1.102E 01	5.641E-03	1.642E 01	6.409E-03
3.736E 01	4.058E 00	7.737E 00	-5.242E 02	0.000	0.000	0.000	9.080E 02	1.102E 01	5.644E-03	2.022E 01	1.035E-02
3.803E 01	3.785E 00	1.285E 01	-5.3378E 02	0.000	0.000	0.000	9.213E 02	9.692E 00	5.065E-03	3.359E 01	1.720E-02
3.835E 01	5.335E 00	1.551E 01	-5.360E 02	0.000	0.000	0.000	1.030E 03	1.134E 01	7.139E-03	4.034E 01	2.076E-02
3.855E 01	6.955E 00	1.536E 01	-5.353E 02	0.000	0.000	0.000	1.062E 03	1.125E 01	9.347E-03	4.015E 01	2.058E-02
3.855E 01	7.423E 00	1.532E 01	-5.351E 02	0.000	0.000	0.000	1.074E 03	1.040E 01	9.938E-03	4.005E 01	2.051E-02
3.901E 01	8.140E 00	1.549E 01	-5.340E 02	0.000	0.000	0.000	1.092E 03	2.127E 01	1.089E-02	4.047E 01	2.073E-02
3.966E 01	1.413E 01	1.884E 01	-5.395E 02	0.000	0.000	0.000	1.132E 03	3.692E 01	1.890E-02	4.139E 01	2.119E-02
3.966E 01	1.435E 01	1.849E 01	-5.460E 02	0.000	0.000	0.000	1.144E 03	4.325E 01	2.215E-02	3.264E 01	1.671E-02
3.985E 01	1.721E 01	4.235E 00	-5.729E 02	0.000	0.000	0.000	1.189E 03	4.499E 01	2.304E-02	1.104E 01	5.454E-03
4.000E 01	1.750E 01	4.069E 00	-5.874E 02	0.000	0.000	0.000	1.207E 03	5.574E 01	2.342E-02	1.069E 00	5.472E-03
4.005E 01	2.002E 01	3.752E 01	-6.225E 02	0.000	0.000	0.000	1.248E 03	6.923E 01	2.703E-02	9.865E 00	5.092E-03
4.048E 01	2.005E 01	3.779E 00	-6.283E 02	0.000	0.000	0.000	1.354E 03	5.382E 01	2.756E-02	9.875E 00	5.057E-03
4.081E 01	2.007E 01	3.779E 00	-6.292E 02	0.000	0.000	0.000	1.355E 03	5.403E 01	2.767E-02	9.877E 00	5.058E-03
4.134E 01	2.789E 01	3.485E 01	-7.395E 02	0.000	0.000	0.000	1.365E 03	7.289E 01	3.733E-02	1.005E 01	5.146E-03
4.141E 01	2.819E 01	3.650E 01	-7.474E 02	0.000	0.000	0.000	1.373E 03	7.421E 01	3.800E-02	1.006E 01	5.152E-03
4.162E 01	2.910E 01	4.095E 00	-7.594E 02	0.000	0.000	0.000	1.384E 03	7.605E 01	3.894E-02	1.070E 01	5.460E-03
4.206E 01	1.856E 01	6.870E 00	-8.268E 02	0.000	0.000	0.000	1.639E 03	3.283E 01	1.681E-02	1.743E 01	8.926E-03
4.412E 01	1.657E 01	1.115E 01	-8.537E 02	0.000	0.000	0.000	1.701E 03	4.331E 01	2.218E-02	2.913E 01	1.492E-02
4.431E 01	1.701E 01	1.098E 01	-8.573E 02	0.000	0.000	0.000	1.723E 03	4.445E 01	2.276E-02	2.869E 01	1.465E-02
4.470E 01	1.819E 01	1.052E 01	-8.694E 02	0.000	0.000	0.000	1.782E 03	4.753E 01	2.434E-02	2.748E 01	1.407E-02
4.482E 01	1.815E 01	1.047E 01	-8.705E 02	0.000	0.000	0.000	1.788E 03	4.742E 01	2.428E-02	2.737E 01	1.403E-02
4.623E 01	1.678E 01	9.143E 00	-8.901E 02	0.000	0.000	0.000	1.622E 03	4.385E 01	2.246E-02	2.389E 01	1.224E-02
4.737E 01	1.977E 01	8.455E 00	-8.920E 02	0.000	0.000	0.000	2.092E 03	4.121E 01	2.110E-02	2.331E 01	1.041E-02
4.737E 01	1.559E 01	8.100E 00	-8.916E 02	0.000	0.000	0.000	2.099E 03	4.022E 01	2.060E-02	2.117E 01	1.084E-02
4.811E 01	1.001E 01	9.103E 00	-8.782E 02	0.000	0.000	0.000	2.192E 03	2.773E 01	1.420E-02	2.370E 01	1.216E-02
4.882E 01	1.006E 01	1.006E 01	-8.460E 02	0.000	0.000	0.000	2.280E 03	2.630E 01	1.347E-02	2.630E 01	1.347E-02
4.935E 01	1.078E 01	1.078E 01	-8.173E 02	0.000	0.000	0.000	2.524E 03	2.817E 01	1.443E-02	2.617E 01	1.443E-02
5.071E 01	4.489E 00	4.489E 00	-7.609E 02	0.000	0.000	0.000	2.524E 03	1.168E 01	5.980E-03	1.168E 01	5.980E-03
5.286E 01	6.255E 00	6.255E 00	-7.020E 02	0.000	0.000	0.000	2.791E 03	1.627E 01	6.331E-03	1.627E 01	6.331E-03
5.336E 01	5.656E 00	5.656E 00	-6.665E 02	0.000	0.000	0.000	2.654E 03	1.489E 01	7.622E-03	1.489E 01	7.622E-03
5.411E 01	5.053E 00	5.053E 00	-6.657E 02	0.000	0.000	0.000	2.950E 03	1.328E 01	6.803E-03	1.328E 01	6.803E-03
5.487E 01	4.462E 00	4.462E 00	-6.472E 02	0.000	0.000	0.000	3.048E 03	1.166E 01	5.972E-03	1.166E 01	5.972E-03
5.572E 01	3.699E 00	3.699E 00	-6.390E 02	0.000	0.000	0.000	3.162E 03	9.589E 00	4.910E-03	9.589E 00	4.910E-03
5.622E 01	3.194E 00	3.194E 00	-5.933E 02	0.000	0.000	0.000	3.209E 03	8.347E 00	4.274E-03	8.347E 00	4.274E-03
5.635E 01	1.612E 00	3.459E 00	-5.924E 02	0.000	0.000	0.000	3.216E 03	4.214E 00	2.158E-03	4.214E 00	2.158E-03
5.649E 01	1.612E 00	3.020E 00	-5.904E 02	0.000	0.000	0.000	3.234E 03	4.214E 00	2.158E-03	7.894E 00	4.042E-03
5.657E 01	2.949E 00	2.949E 00	-5.892E 02	0.000	0.000	0.000	3.244E 03	7.707E 00	3.947E-03	7.707E 00	3.947E-03
5.682E 01	2.700E 00	2.700E 00	-5.655E 02	0.000	0.000	0.000	3.280E 03	7.056E 00	3.613E-03	7.056E 00	3.613E-03
5.705E 01	2.826E 00	2.826E 00	-5.629E 02	0.000	0.000	0.000	3.309E 03	7.190E 00	3.784E-03	7.190E 00	3.784E-03
5.780E 01	3.237E 00	3.237E 00	-5.746E 02	0.000	0.000	0.000	3.302E 03	6.461E 00	4.333E-03	6.461E 00	4.333E-03
5.882E 01	3.562E 00	3.562E 00	-5.668E 02	0.000	0.000	0.000	3.332E 03	9.310E 00	4.767E-03	9.310E 00	4.767E-03
6.082E 01	2.506E 00	2.506E 00	-5.661E 02	0.000	0.000	0.000	3.790E 03	6.533E 00	3.346E-03	6.533E 00	3.346E-03
6.225E 01	3.506E 00	3.506E 00	-5.661E 02	0.000	0.000	0.000	3.772E 03	3.920E 00	2.007E-03	3.920E 00	2.007E-03
6.471E 01	3.506E 00	3.506E 00	-5.661E 02	0.000	0.000	0.000	4.289E 03	9.304E 00	4.764E-03	9.304E 00	4.764E-03
6.509E 01	4.612E 00	3.874E 00	-5.661E 02	0.000	0.000	0.000	4.337E 03	1.205E 01	6.173E-03	1.015E 01	5.185E-03



XARS	P=IB	P=OB	PDA	W0X	U=IB	Q=OB	CANALL	P=IB/P8U	P=IB/P10	P=OB/P8U	P=OB/P10
6.51E 01	4.612E 00	3.988E 00	-5.661E 02	-1.713E 03	-7.225E 02	-9.907E 02	4.322E 03	1.205E 01	6.173E-03	1.021E 01	5.230E-03
6.53E 01	4.380E 00	4.075E 00	-5.661E 02	-1.718E 03	-7.240E 02	-9.902E 02	4.368E 03	1.134E 01	5.606E-03	1.065E 01	5.453E-03
6.69E 01	2.080E 00	3.230E 00	-5.273E 02	-1.755E 03	-7.349E 02	-1.029E 03	4.531E 03	5.036E 00	2.704E-03	8.441E 00	4.321E-03
6.76E 01	1.900E 00	5.100E 00	-4.651E 02	-1.767E 03	-7.384E 02	-1.029E 03	4.685E 03	5.071E 00	2.597E-03	1.333E 01	6.625E-03
6.84E 01	1.780E 00	3.537E 00	-3.840E 02	-1.781E 03	-7.417E 02	-1.040E 03	4.780E 03	4.522E 00	2.382E-03	9.297E 00	4.761E-03
6.91E 01	1.550E 00	2.115E 00	-3.273E 02	-1.795E 03	-7.444E 02	-1.051E 03	4.888E 03	4.050E 00	2.074E-03	5.527E 00	2.830E-03
6.97E 01	1.335E 00	1.880E 00	-2.903E 02	-1.807E 03	-7.465E 02	-1.061E 03	4.922E 03	3.541E 00	1.813E-03	4.914E 00	2.516E-03
7.07E 01	1.103E 00	1.515E 00	-2.435E 02	-1.826E 03	-7.493E 02	-1.077E 03	5.026E 03	3.091E 00	1.583E-03	3.959E 00	2.027E-03
7.11E 01	1.105E 00	1.469E 00	-2.250E 02	-1.835E 03	-7.504E 02	-1.084E 03	5.088E 03	2.888E 00	1.479E-03	3.839E 00	1.966E-03
7.20E 01	9.86E-01	1.305E 00	-2.077E 02	-1.849E 03	-7.530E 02	-1.105E 03	5.272E 03	2.578E 00	1.320E-03	3.410E 00	1.746E-03
7.28E 01	9.780E-01	1.142E 00	-1.630E 02	-1.861E 03	-7.541E 02	-1.107E 03	5.290E 03	2.548E 00	1.305E-03	2.984E 00	1.528E-03
7.35E 01	7.93E-01	3.250E-01	-1.361E 02	-1.873E 03	-7.554E 02	-1.117E 03	5.374E 03	2.086E 00	1.068E-03	8.493E-01	4.349E-04
7.39E 01	7.974E-01	3.206E-01	-1.355E 02	-1.873E 03	-7.554E 02	-1.117E 03	5.375E 03	2.084E 00	1.067E-03	8.380E-01	4.291E-04
7.49E 01	4.850E-01	0.000	-1.219E 02	-1.897E 03	-7.573E 02	-1.139E 03	5.426E 03	1.267E 00	6.490E-04	0.000	0.000
7.77E 01	3.050E-01	0.000	-1.061E 02	-1.900E 03	-7.603E 02	-1.139E 03	5.535E 03	7.071E-01	4.082E-04	0.000	0.000
8.19E 01	4.100E-01	0.000	-9.094E 01	-1.902E 03	-7.627E 02	-1.139E 03	5.630E 03	1.071E 00	5.467E-04	0.000	0.000
8.44E 01	4.800E-01	0.000	-8.009E 01	-1.904E 03	-7.643E 02	-1.139E 03	5.684E 03	1.254E 00	6.424E-04	0.000	0.000
8.73E 01	6.200E-01	0.000	-6.768E 01	-1.907E 03	-7.672E 02	-1.139E 03	5.707E 03	1.820E 00	8.297E-04	0.000	0.000
8.73E 01	6.203E-01	0.000	-6.768E 01	-1.907E 03	-7.672E 02	-1.139E 03	5.707E 03	1.821E 00	8.301E-04	0.000	0.000

HEADING = 0060 BLOCK = 55 TIME = 155.093 MACH 6.0 PI = 747.249 TI = 2950.4

X	DRAG	CDRAG	CF	HC
4.08E 01	1.132E 02	1.132E 02	2.253E-03	4.463E-02
4.04E 01	1.774E-01	1.134E 02	2.254E-03	4.466E-02
4.134E 01	1.663E 01	1.300E 02	2.387E-03	4.618E-02
4.181E 01	1.166E 00	1.112E 02	2.396E-03	4.646E-02
4.198E 01	1.636E 00	1.288E 02	2.409E-03	4.680E-02
4.266E 01	1.714E 01	1.499E 02	2.481E-03	5.047E-02
4.413E 01	2.914E 01	1.791E 02	2.518E-03	4.930E-02
4.431E 01	3.086E 00	1.622E 02	2.523E-03	4.960E-02
4.482E 01	7.491E-01	1.913E 02	2.543E-03	4.961E-02
4.686E 01	2.333E 01	2.148E 02	2.578E-03	4.750E-02
4.731E 01	1.641E 01	2.112E 02	2.589E-03	4.449E-02
4.737E 01	6.891E-01	2.321E 02	2.589E-03	4.418E-02
4.811E 01	1.079E 01	2.429E 02	2.583E-03	4.120E-02
4.882E 01	9.620E 00	2.525E 02	2.583E-03	3.719E-02
4.932E 01	6.656E 00	2.592E 02	2.533E-03	3.431E-02
5.076E 01	1.608E 01	2.753E 02	2.466E-03	2.852E-02
5.286E 01	2.026E 01	2.956E 02	2.435E-03	2.271E-02
5.336E 01	4.220E 00	2.999E 02	2.421E-03	2.161E-02
5.411E 01	6.135E 00	3.060E 02	2.402E-03	2.014E-02
5.482E 01	5.088E 00	3.119E 02	2.385E-03	1.886E-02
5.572E 01	6.538E 00	3.184E 02	2.369E-03	1.798E-02
5.629E 01	2.330E 00	3.207E 02	2.323E-03	1.374E-02
5.635E 01	3.113E-01	3.211E 02	2.322E-03	1.374E-02
5.649E 01	7.814E-01	3.218E 02	2.320E-03	1.363E-02
5.657E 01	4.501E-01	3.233E 02	2.314E-03	1.373E-02
5.685E 01	1.572E 00	3.239E 02	2.307E-03	1.363E-02
5.707E 01	1.266E 00	3.251E 02	2.303E-03	1.358E-02
5.780E 01	4.035E 00	3.252E 02	2.293E-03	1.329E-02
5.862E 01	5.597E 00	3.347E 02	2.282E-03	1.313E-02
6.082E 01	1.115E 01	3.359E 02	2.280E-03	1.357E-02
6.232E 01	6.016E 00	3.340E 02	2.277E-03	1.344E-02
6.471E 01	1.385E 01	3.408E 02	2.306E-03	1.340E-02
6.502E 01	2.001E 00	3.488E 02	2.333E-03	1.261E-02
6.535E 01	2.032E-01	3.700E 02	2.338E-03	1.194E-02
6.535E 01	9.672E-01	3.710E 02	2.335E-03	1.183E-02
6.692E 01	7.239E 00	3.783E 02	2.244E-03	8.386E-03
6.766E 01	2.599E 00	3.809E 02	2.293E-03	1.033E-02
6.843E 01	3.014E 00	3.839E 02	2.238E-03	6.394E-03
6.915E 01	2.230E 00	3.862E 02	2.167E-03	6.313E-03
6.976E 01	1.637E 00	3.878E 02	2.142E-03	5.736E-03
7.071E 01	2.289E 00	3.901E 02	2.106E-03	4.988E-03
7.114E 01	9.634E-01	3.911E 02	2.097E-03	4.808E-03
7.267E 01	3.226E 00	3.943E 02	2.074E-03	4.343E-03
7.282E 01	2.830E-01	3.946E 02	2.060E-03	4.134E-03
7.357E 01	1.106E 00	3.957E 02	1.951E-03	2.544E-03
7.357E 01	1.672E-03	3.957E 02	1.950E-03	2.535E-03
7.495E 01	5.048E-01	3.962E 02	1.923E-03	2.268E-03
7.775E 01	7.815E-01	3.970E 02	1.840E-03	1.563E-03
8.165E 01	7.774E-01	3.978E 02	1.873E-03	1.964E-03
8.446E 01	4.705E-01	3.982E 02	1.849E-03	2.210E-03
8.732E 01	2.235E-01	3.985E 02	1.921E-03	2.675E-03
8.732E 01	0.000	3.985E 02	1.921E-03	2.676E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

302

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST..... (LBF) -475. (LBF)  
 MEASURED THRUST..... (LBF) -545. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... (LBF-SEC/LBM) -475. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... (LBF-SEC/LBM) -545. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... -1918  
 MEASURED THRUST COEFFICIENT..... -2197

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED  
 STREAM THRUST..... 0. (LBF)  
 NET THRUST..... 0. (LBF)  
 SPECIFIC IMPULSE..... 0. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.0000

ANGLE OF ATTACK ..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9856  
 ADDITIVE DRAG COEFFICIENT..... 0.0000  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1609  
 DELTA P12..... 0.1198 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3658  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1633  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8873  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9033  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9444  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8972  
 ENTHALPY AT P0 = SUPERSONIC..... -3.41 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 29.10 (BTU/LBM)

MOMENTUM AND FORCES

COMBUSTION

INLET FRICTION DRAG..... 133.2 (LBF)  
 INLET MOMENTUM CHANGE..... -741.5 (LBF)  
 COMBUSTOR FRICTION DRAG..... 256.6 (LBF)  
 COMBUSTOR STRUT DRAG..... 8.91 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... -203. (LBF)  
 NOZZLE FRICTION DRAG..... 28.54 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 470. (LBF)  
 EXTERNAL FRICTION DRAG..... 42.70 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1014. (LBF)  
 TOTAL EXTERNAL DRAG..... -1057. (LBF)  
 TOTAL STRUT DRAG..... 8.91 (LBF)  
 CAVITY FORCE..... -1051. (LBF)  
 CALCULATED LOAD CELL FORCE..... -2593. (LBF)  
 MEASURED LOAD CELL FORCE..... -2692. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE

FUEL-AIR RATIO..... 0.0000  
 EQUIVALENCE RATIO..... 0.0000  
 COMBUSTOR EFFICIENCY..... 0.0000  
 TOTAL PRESSURE RATIO..... 0.2340  
 COMBUSTOR EFFECTIVENESS..... 0.6506  
 INJECTOR DISCHARGE COEFFICIENTS

NOZZLE  
 VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9941  
 NOZZLE COEFFICIENT = C7..... 0.9502  
 PROCESS EFFICIENCY..... 1.0032  
 KINETIC ENERGY EFFICIENCY..... 0.9876

STATIONS

FUEL INJECTORS

NOMINAL COHL LEADING EDGE..... 34.684 (IN)  
 SPIKE TRANSLATION..... 0.3468 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COHL LEADING EDGE..... 35.233 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.573 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.325 (IN)  
 STRUT LEADING EDGE..... 56.484 (IN)  
 STRUT TRAILING EDGE..... 65.084 (IN)  
 COMBUSTOR EXIT..... 65.084 (IN)

INJECTORS  
 1A  
 1B  
 1C  
 2A  
 2C  
 3A  
 3B  
 4

STATION  
 40.400  
 41.334  
 44.300  
 48.809  
 46.250  
 54.099  
 56.284  
 44.834

VALVE

Reading 60

$t = 178.19 \text{ sec,}$

03/04/75

READING = 0000 BLOCK = 80 TIME = 178.193 MACH 6.0 PT = 748.749 TT = 2982.8  
RAMJET PERFORMANCE

SUMMARY REPORT

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/VAC	MOMT	G	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	748.749	2983	664.2( 769)	1.2933	28.966	2573											
0.000	0.368	404	-32.0( 97)	1.3989	28.965	984	5.996	5903	1.825	0.10639	26.788	0.8831	5012	9.759	187.1		
SPIKE TIP N8	2	0	5														
0.600	18.150	2983	664.2( 769)	1.2931	28.965	2573											
0.600	16.418	2915	643.9( 770)	1.2953	28.965	2546	0.396	1008	2.080	0.10639	26.788	0.8831	4973	1.666	185.6		
WIND TUNNEL	3	0	0														
0.000	748.749	2983	664.2( 769)	1.2933	28.966	2573											
0.000	0.368	402	-32.0( 96)	1.3988	28.965	982	6.010	5904	1.825	0.10536	26.529	0.8831	4965	9.667	187.1		
SPIKE TIP N8	4	0	0														
0.600	18.150	2983	664.2( 769)	1.2931	28.965	2573											
0.600	16.456	2917	644.4( 770)	1.2952	28.965	2547	0.391	996	2.080	0.10536	26.529	0.8831	4965	1.631	187.2		
INLET THROAT	5	0	4														
40.400	273.470	2947	633.5( 779)	1.2944	28.966	2559											
40.400	14.189	1432	239.4( 368)	1.3485	28.965	1897	2.451	4552	1.891	0.04711	26.788	0.1104	4258	60.999	158.9		
INLET UPN8K	6	0	3														
40.400	273.470	2947	633.5( 779)	1.2944	28.966	2559											
40.400	14.189	1432	239.4( 368)	1.3485	28.965	1897	2.451	4552	1.891	0.04711	26.788	0.1104	4301	62.027	160.6		
INLET DOWN8K	7	0	8														
40.400	122.630	2947	633.5( 779)	1.2944	28.966	2559											
40.400	104.920	2844	622.5( 749)	1.2977	28.966	2517	0.495	1245	1.946	0.06101	26.788	0.1215	4301	16.661	160.6		
COMBUSTOR	8	0	1														
40.410	234.564	2910	635.2( 790)	1.2966	27.801	2598											
40.410	13.832	1456	227.3( 374)	1.3516	27.801	1876	2.467	4627	1.965	0.05009	26.875	0.1104	4256	68.319	158.4	0.10	0.07
COMBUSTOR	9	0	2														
41.340	168.001	2839	657.7( 811)	1.3006	26.553	2629											
41.340	20.741	1708	307.9( 464)	1.3405	26.552	2070	2.021	4184	2.034	0.05519	26.976	0.1103	4094	62.105	151.8	0.21	0.04
COMBUSTOR	10	0	3														
41.350	174.478	2795	657.7( 798)	1.3026	26.506	2613											
41.350	20.815	1663	308.8( 452)	1.3430	26.506	2047	2.041	4178	2.047	0.05449	26.976	0.1103	4092	61.980	151.7	0.21	0.01
COMBUSTOR	11	0	4														
41.415	172.522	2787	657.3( 796)	1.3030	26.499	2610											
41.415	21.299	1672	313.6( 484)	1.3426	26.499	2053	2.020	4147	2.047	0.05488	26.976	0.1103	4079	61.543	151.2	0.21	0.00
COMBUSTOR	12	0	5														
41.500	168.910	2785	656.9( 793)	1.3031	26.498	2609											
41.500	22.476	1703	323.0( 463)	1.3412	26.498	2070	1.975	4088	2.048	0.05512	26.976	0.1103	4062	60.676	150.6	0.21	0.00
COMBUSTOR	13	0	6														
42.460	161.667	2765	650.6( 789)	1.3037	26.498	2601											
42.460	26.990	1850	366.7( 507)	1.3351	26.498	2153	1.750	3768	2.039	0.04616	26.976	0.1113	3929	55.411	145.7	0.21	0.00
COMBUSTOR	14	0	7														
44.135	105.871	3116	636.6( 895)	1.2867	26.922	2721											
44.135	44.330	2554	455.1( 717)	1.3056	26.922	2461	1.215	3015	2.109	0.01185	26.976	0.1155	3840	42.728	142.3	0.21	0.34
COMBUSTOR	15	0	8														
44.310	105.061	3119	635.2( 896)	1.2865	26.931	2722											
44.310	45.346	2575	459.1( 723)	1.3047	26.932	2491	1.192	2968	2.109	0.01095	26.976	0.1156	3832	42.024	142.0	0.21	0.35
COMBUSTOR	16	0	9														
44.800	102.935	3116	630.5( 894)	1.2864	26.943	2720											
44.800	46.187	2622	470.2( 736)	1.3030	26.944	2511	1.128	2832	2.110	0.00749	26.976	0.1161	3807	39.941	141.1	0.21	0.36
COMBUSTOR	17	0	10														
44.850	102.791	3113	630.0( 893)	1.2866	26.941	2719											
44.850	46.234	2620	470.3( 737)	1.3031	26.942	2510	1.126	2827	2.110	0.00712	26.976	0.1161	3804	39.848	141.0	0.21	0.36
COMBUSTOR	18	0	11														
46.250	95.543	2702	633.9( 856)	1.3075	23.756	2719											
46.250	49.539	2310	496.4( 720)	1.3208	23.756	2527	1.036	2623	2.273	0.06469	27.254	0.1231	3783	35.241	138.8	0.52	0.08

READING = 0060 BLOCK = 80 TIME = 178.193 MACH 8.0 PT = 708.709 TT = 2982.0

	P	T	H	GAMMA	MOLWT	80V	MACH	VEL	S	W/A	W	A/C	MUMTM	G	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	95.487	2704	633.81	(856)	1.3074	23.758	2720										
46.260	49.548	2312	496.41	(720)	1.3207	23.758	2520	1.037	2622	2.273	0.86402	27.254	0.1332	3784	33.204	138.8	0.52 0.06
COMBUSTOR	0	20	13	4													
47.310	91.273	2870	622.21	(911)	1.2994	23.945	2783										
47.310	50.527	2499	490.61	(782)	1.3118	23.946	2609	0.983	2566	2.292	0.80384	27.254	0.1324	3887	32.053	142.6	0.82 0.15
COMBUSTOR	0	21	14	3													
47.375	90.954	2888	621.51	(917)	1.2986	23.964	2789										
47.375	50.628	2521	491.21	(789)	1.3109	23.964	2618	0.975	2554	2.294	0.79852	27.254	0.1333	3898	31.689	143.0	0.82 0.16
COMBUSTOR	0	22	15	4													
48.110	87.537	3047	613.81	(971)	1.2908	24.139	2846										
48.110	49.777	2678	481.01	(840)	1.3033	24.140	2681	0.962	2978	2.310	0.74876	27.254	0.1421	3996	30.002	146.6	0.82 0.23
COMBUSTOR	0	23	16	6													
48.815	82.304	2801	621.71	(980)	1.3041	21.597	2900										
48.815	40.022	2360	450.81	(811)	1.3191	21.598	2677	1.092	2924	2.486	0.69292	27.545	0.1552	4094	31.487	148.6	0.85 0.13
COMBUSTOR	0	24	17	2													
48.825	82.248	2804	621.61	(981)	1.3039	21.600	2901										
48.825	39.940	2362	450.31	(812)	1.3190	21.600	2678	1.093	2928	2.486	0.69203	27.545	0.1554	4096	31.486	148.7	0.85 0.13
COMBUSTOR	0	25	18	4													
49.335	79.482	2920	617.21	(1024)	1.2984	21.709	2947										
49.335	35.554	2317	421.11	(830)	1.3155	21.710	2699	1.161	3132	2.500	0.60721	27.545	0.1662	4194	31.502	152.3	0.85 0.17
COMBUSTOR	0	26	19	8													
50.765	71.969	3264	606.41	(1182)	1.2816	22.039	3072										
50.765	31.800	2703	382.11	(933)	1.3009	22.041	2816	1.190	3350	2.538	0.55160	27.545	0.1950	4426	28.728	160.7	0.85 0.27
COMBUSTOR	0	27	20	4													
52.865	66.103	3332	592.81	(1253)	1.2672	22.321	3158										
52.865	22.350	2785	288.91	(959)	1.2941	22.327	2833	1.377	3900	2.564	0.45210	27.545	0.2379	4700	27.398	170.6	0.85 0.35
COMBUSTOR	0	28	21	3													
53.365	69.327	3359	589.91	(1263)	1.2657	22.353	3165										
53.365	20.612	2765	266.91	(950)	1.2944	22.360	2821	1.425	4020	2.567	0.43362	27.545	0.2480	4751	27.091	172.5	0.85 0.36
COMBUSTOR	0	29	22	4													
54.115	64.089	3599	585.81	(1278)	1.2633	22.401	3177										
54.115	18.588	2748	238.81	(943)	1.2943	22.409	2809	1.483	4164	2.570	0.40674	27.545	0.2631	4819	26.468	175.0	0.85 0.38
COMBUSTOR	0	30	23	3													
54.875	63.617	3608	581.71	(1280)	1.2628	22.415	3177										
54.875	16.537	2684	208.11	(918)	1.2963	22.424	2778	1.587	4324	2.571	0.38653	27.545	0.2782	4880	25.973	177.2	0.85 0.38
COMBUSTOR	0	31	24	4													
55.760	61.913	3655	577.41	(1289)	1.2598	22.474	3192										
55.760	15.213	2694	185.61	(921)	1.2951	22.485	2777	1.594	4428	2.576	0.36387	27.545	0.2956	4942	25.038	179.4	0.85 0.40
COMBUSTOR	0	32	25	5													
56.300	60.679	4093	573.01	(1466)	1.2309	22.921	3306										
56.300	14.408	3211	190.71	(1112)	1.2895	22.961	2971	1.476	4385	2.621	0.29228	27.545	0.3679	5112	19.918	185.6	0.85 0.54
COMBUSTOR	0	33	26	5													
56.335	55.453	3757	574.71	(1338)	1.2534	22.581	3220										
56.335	11.193	2682	125.81	(906)	1.2947	22.597	2754	1.721	4740	2.592	0.29145	27.545	0.3690	5115	21.467	185.7	0.85 0.43
COMBUSTOR	0	34	27	3													
56.495	55.302	3764	574.11	(1340)	1.2529	22.589	3222										
56.495	11.088	2684	122.91	(907)	1.2946	22.605	2754	1.725	4752	2.592	0.28936	27.545	0.3717	5124	21.368	186.0	0.85 0.44
COMBUSTOR	0	35	28	6													
56.575	49.656	4075	573.81	(1459)	1.2323	22.905	3301										
56.575	13.994	3161	177.71	(1093)	1.2716	22.944	2951	1.508	4452	2.619	0.29265	27.545	0.3755	5129	20.249	186.2	0.85 0.53
COMBUSTOR	0	36	29	3													
56.855	50.399	4059	572.61	(1453)	1.2334	22.881	3298										
56.855	13.575	3116	163.71	(1075)	1.2737	22.929	2934	1.530	4513	2.616	0.29173	27.545	0.3686	5145	20.459	186.8	0.85 0.53
COMBUSTOR	0	37	30	4													
57.081	51.438	4022	571.71	(1439)	1.2361	22.855	3289										
57.081	13.049	3041	152.31	(1047)	1.2771	22.889	2905	1.577	4581	2.613	0.29113	27.545	0.3694	5157	20.728	187.2	0.85 0.52

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	M	A/AC	MQTH	G	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	4													
57.605	54.837	3088	568.8(1388)	1.2451	22.726	3255											
57.605	11.362	2791	112.0( 953)	1.2881	22.749	2803	1.706	4781	2.600	0.28657	27.545	0.3753	5165	21.293	188.3	0.85	0.48
COMBUSTOR	0	39	32	8													
58.825	101.627	3112	569.4(1093)	1.2879	21.994	3010											
58.825	5.737	1556	22.0( 510)	1.3465	21.995	2176	2.493	5424	2.490	0.28474	27.545	0.3777	5199	24.003	188.7	0.85	0.26
COMBUSTOR	0	40	33	6													
60.835	47.247	4442	559.3(1600)	1.2040	23.330	3376											
60.835	17.329	3717	211.0(1304)	1.2399	23.423	3128	1.334	4171	2.637	0.29465	27.545	0.3650	5191	19.101	188.4	0.85	0.67
COMBUSTOR	0	41	34	4													
62.255	49.409	4351	554.7(1543)	1.2118	23.242	3386											
62.255	14.687	3562	186.6(1246)	1.2404	23.319	3080	1.390	4281	2.629	0.30264	27.545	0.3593	5183	20.132	184.2	0.85	0.64
COMBUSTOR	0	42	35	5													
64.719	43.673	4667	545.0(1687)	1.1841	23.611	3411											
64.719	21.557	4181	283.6(1485)	1.2076	23.741	3252	1.114	3622	2.650	0.28687	27.545	0.3749	5170	16.145	187.7	0.85	0.77
COMBUSTOR	0	43	36	4													
65.095	80.389	4700	544.2(1699)	1.1800	23.652	3414											
65.095	21.594	4277	308.8(1523)	1.1999	23.783	3276	1.086	3832	2.657	0.26669	27.545	0.4032	5169	14.226	187.7	0.85	0.79
COMBUSTOR	0	44	37	21													
65.095	40.389	4821	627.0(1751)	1.1726	23.579	3452											
65.095	21.023	4392	374.8(1571)	1.1912	23.742	3310	1.074	3555	2.675	0.26669	27.545	0.4032	5215	14.736	189.3	0.85	0.79
NOZZLE	0	45	38	5													
67.331	40.389	4700	544.2(1687)	1.1800	23.652	3414											
67.331	1.211	2821	485.5( 793)	1.2872	23.902	2546	2.819	7178	2.657	0.05552	27.545	1.9371	6746	6.193	244.9	0.85	0.79
NOZZLE	0	46	39	5													
67.331	40.389	4700	544.2(1687)	1.1800	23.652	3414											
67.331	0.388	1864	687.3( 592)	1.23101	23.903	2254	3.883	7850	2.657	0.02528	27.545	4.2545	7144	3.084	259.3	0.85	0.79
NOZZLE	0	47	40	5													
67.331	40.389	4821	627.0(1751)	1.1726	23.579	3452											
67.331	1.261	2559	433.9( 644)	1.28821	23.902	2612	2.799	7286	2.678	0.05552	27.545	1.9371	6863	6.286	248.2	0.85	0.79
NOZZLE	0	48	41	5													
67.331	40.389	4821	627.0(1751)	1.1726	23.579	3452											
67.331	0.388	1958	654.1( 625)	1.23058	23.903	2306	3.872	8007	2.675	0.02434	27.545	4.3819	7290	3.054	264.7	0.85	0.79
PCTIVE	0	49	61	0													
65.095	273.470	5286	544.2(1929)	1.1683	24.306	3534											
65.095	0.388	1464	1131.1( 485)	1.3224	24.756	1972	4.643	9156	2.804	0.03899	27.545	2.7652	8113	9.534	294.6	0.85	1.00
PCTIVE	0	50	62	0													
67.331	25.207	4630	518.7(1671)	1.1770	23.641	3385											
67.331	1.517	2783	348.0( 929)	1.2735	23.901	2715	2.425	6586	2.691	0.05552	27.545	1.9371	6391	5.682	232.0	0.85	0.79

HEADING = 0060 BLOCK = 40 TIME = 178.193 PACH 6.0 PI = 748.744 TI = 292.6

XAB	P-IB	P-OB	PDA	COX	W-IB	G-OB	CAWALL	P-IB/PSU	P-IB/P10	P-OB/PSU	P-OB/P10
6.981E+01	1.065E 00	0.000	-4.422E+01	0.000	0.000	0.000	2.470E+02	2.745E 00	1.422E+03	0.000	0.000
1.065E 01	1.065E 00	0.000	-3.546E 01	0.000	0.000	0.000	1.634E 02	2.745E 00	1.422E+03	0.000	0.000
3.070E 01	2.005E 00	0.000	-1.680E 02	0.000	0.000	0.000	5.053E 02	5.652E 00	2.945E+03	0.000	0.000
3.508E 01	3.931E 00	0.000	-3.699E 02	0.000	0.000	0.000	6.872E 02	1.014E 01	5.254E+03	0.000	0.000
3.523E 01	3.972E 00	0.000	-4.362E 02	0.000	0.000	0.000	6.872E 02	1.035E 01	5.313E+03	1.484E 01	7.693E+03
3.524E 01	3.980E 00	5.723E 00	-4.363E 02	0.000	0.000	0.000	6.872E 02	1.035E 01	5.313E+03	1.475E 01	7.644E+03
3.555E 01	4.070E 00	3.831E 00	-4.433E 02	0.000	0.000	0.000	7.185E 02	1.049E 01	5.436E+03	9.874E 00	5.117E+03
3.590E 01	4.097E 00	1.675E 00	-4.609E 02	0.000	0.000	0.000	7.547E 02	1.030E 01	5.316E+03	4.317E 00	2.237E+03
3.604E 01	4.210E 00	2.326E 00	-4.700E 02	0.000	0.000	0.000	7.705E 02	1.022E 01	5.295E+03	5.995E 00	3.107E+03
3.640E 01	4.210E 00	4.088E 00	-4.913E 02	0.000	0.000	0.000	8.142E 02	1.036E 01	5.430E+03	1.054E 01	5.460E+03
3.701E 01	4.220E 00	6.312E 00	-5.164E 02	0.000	0.000	0.000	8.703E 02	1.088E 01	5.936E+03	1.627E 01	6.410E+03
3.736E 01	4.098E 00	7.800E 00	-5.299E 02	0.000	0.000	0.000	9.083E 02	1.088E 01	5.920E+03	2.010E 01	1.042E+02
3.803E 01	3.755E 01	1.290E 01	-5.429E 02	0.000	0.000	0.000	9.810E 02	9.677E 00	5.015E+03	3.123E 01	1.722E+02
3.838E 01	3.541E 00	1.561E 01	-5.414E 02	0.000	0.000	0.000	1.021E 03	1.426E 01	7.001E+03	4.023E 01	2.085E+02
3.875E 01	7.381E 00	1.539E 01	-5.421E 02	0.000	0.000	0.000	1.068E 03	1.902E 01	9.057E+03	3.966E 01	2.055E+02
3.885E 01	7.908E 00	1.532E 01	-5.426E 02	0.000	0.000	0.000	1.074E 03	2.039E 01	1.056E+02	3.949E 01	2.047E+02
3.901E 01	8.690E 00	1.587E 01	-5.421E 02	0.000	0.000	0.000	1.091E 03	2.239E 01	1.161E+02	3.986E 01	2.067E+02
3.936E 01	1.461E 01	1.581E 01	-5.498E 02	0.000	0.000	0.000	1.138E 03	3.731E 01	1.999E+02	4.075E 01	2.112E+02
3.950E 01	1.695E 01	1.272E 01	-5.562E 02	0.000	0.000	0.000	1.148E 03	4.358E 01	2.264E+02	4.279E 01	1.699E+02
3.985E 01	1.765E 01	4.625E 00	-5.637E 02	0.000	0.000	0.000	1.205E 03	4.508E 01	2.357E+02	4.508E 01	1.772E+03
4.000E 01	1.749E 01	4.364E 00	-5.680E 02	0.000	0.000	0.000	1.205E 03	4.631E 01	2.395E+02	4.631E 01	1.828E+03
4.035E 01	2.312E 01	3.725E 00	-6.381E 02	0.000	0.000	0.000	1.248E 03	5.998E 01	3.080E+02	9.600E 00	4.975E+03
4.040E 01	2.392E 01	3.736E 00	-6.444E 02	0.000	0.000	0.000	1.259E 03	6.168E 01	3.195E+02	9.634E 00	4.990E+03
4.041E 01	2.392E 01	3.736E 00	-6.444E 02	0.000	0.000	0.000	1.259E 03	6.168E 01	3.195E+02	9.634E 00	4.990E+03
4.134E 01	3.762E 01	3.963E 00	-7.866E 02	0.000	0.000	0.000	1.368E 03	9.469E 01	5.011E+02	1.022E 01	5.294E+03
4.141E 01	3.862E 01	3.961E 00	-8.020E 02	0.000	0.000	0.000	1.373E 03	9.932E 01	5.197E+02	1.026E 01	5.317E+03
4.150E 01	3.641E 01	1.757E 00	-8.171E 02	0.000	0.000	0.000	1.368E 03	1.037E 02	5.324E+02	1.212E 01	6.179E+03
4.246E 01	3.641E 01	1.757E 00	-8.171E 02	0.000	0.000	0.000	1.368E 03	1.037E 02	5.324E+02	1.212E 01	6.179E+03
4.413E 01	4.931E 01	3.933E 01	-9.968E 02	0.000	0.000	0.000	1.701E 03	1.271E 02	6.587E+02	1.014E 02	5.254E+02
4.431E 01	5.067E 01	4.002E 01	-1.002E 03	0.000	0.000	0.000	1.722E 03	1.368E 02	6.768E+02	1.031E 02	5.345E+02
4.480E 01	5.445E 01	4.192E 01	-1.020E 03	0.000	0.000	0.000	1.782E 03	1.403E 02	7.272E+02	1.080E 02	5.599E+02
4.485E 01	5.435E 01	4.212E 01	-1.022E 03	0.000	0.000	0.000	1.782E 03	1.403E 02	7.272E+02	1.080E 02	5.599E+02
4.625E 01	5.151E 01	4.755E 01	-9.801E 02	0.000	0.000	0.000	1.960E 03	1.328E 02	6.880E+02	1.227E 02	6.352E+02
4.626E 01	5.149E 01	4.760E 01	-9.790E 02	0.000	0.000	0.000	1.960E 03	1.328E 02	6.880E+02	1.227E 02	6.352E+02
4.731E 01	4.937E 01	5.169E 01	-8.638E 02	0.000	0.000	0.000	2.092E 03	1.272E 02	6.935E+02	1.332E 02	6.903E+02
4.737E 01	4.972E 01	5.194E 01	-8.518E 02	0.000	0.000	0.000	2.100E 03	1.261E 02	6.840E+02	1.338E 02	6.937E+02
4.811E 01	5.370E 01	4.585E 01	-7.453E 02	0.000	0.000	0.000	2.191E 03	1.344E 02	7.172E+02	1.182E 02	6.124E+02
4.881E 01	4.002E 01	4.002E 01	-6.042E 02	0.000	0.000	0.000	2.276E 03	1.031E 02	5.345E+02	1.031E 02	5.345E+02
4.882E 01	3.994E 01	3.994E 01	-6.021E 02	0.000	0.000	0.000	2.281E 03	1.039E 02	5.334E+02	1.029E 02	5.334E+02
4.935E 01	3.555E 01	3.555E 01	-6.278E 02	0.000	0.000	0.000	2.342E 03	9.133E 01	4.748E+02	9.163E 01	4.748E+02
5.076E 01	3.120E 01	3.120E 01	-2.511E 02	0.000	0.000	0.000	2.523E 03	8.000E 01	4.167E+02	8.040E 01	4.167E+02
5.286E 01	2.235E 01	2.235E 01	-4.373E 01	0.000	0.000	0.000	2.791E 03	5.760E 01	2.985E+02	5.760E 01	2.985E+02
5.334E 01	2.061E 01	2.061E 01	-3.633E 01	0.000	0.000	0.000	2.851E 03	5.312E 01	2.535E+02	5.312E 01	2.535E+02
5.411E 01	1.850E 01	1.850E 01	-3.358E 01	0.000	0.000	0.000	2.951E 03	4.700E 01	2.403E+02	4.700E 01	2.403E+02
5.487E 01	1.654E 01	1.654E 01	-2.435E 01	0.000	0.000	0.000	3.046E 03	4.262E 01	2.209E+02	4.262E 01	2.209E+02
5.576E 01	1.521E 01	1.521E 01	-3.140E 01	0.000	0.000	0.000	3.162E 03	3.902E 01	2.032E+02	3.902E 01	2.032E+02
5.630E 01	1.441E 01	1.441E 01	-4.865E 01	0.000	0.000	0.000	3.205E 03	3.712E 01	1.924E+02	3.712E 01	1.924E+02
5.635E 01	8.062E 00	1.432E 01	-4.906E 01	0.000	0.000	0.000	3.215E 03	3.691E 01	1.913E+02	3.691E 01	1.913E+02
5.649E 01	8.062E 00	1.411E 01	-4.998E 01	0.000	0.000	0.000	3.234E 03	3.637E 01	1.865E+02	3.637E 01	1.865E+02
5.657E 01	1.399E 01	1.399E 01	-5.055E 01	0.000	0.000	0.000	3.244E 03	3.606E 01	1.869E+02	3.606E 01	1.869E+02
5.683E 01	1.357E 01	1.357E 01	-5.235E 01	0.000	0.000	0.000	3.280E 03	3.498E 01	1.813E+02	3.498E 01	1.813E+02
5.706E 01	1.305E 01	1.305E 01	-5.346E 01	0.000	0.000	0.000	3.302E 03	3.353E 01	1.743E+02	3.353E 01	1.743E+02
5.780E 01	1.136E 01	1.136E 01	-5.695E 01	0.000	0.000	0.000	3.402E 03	2.928E 01	1.518E+02	2.928E 01	1.518E+02
5.882E 01	5.737E 00	5.737E 00	-5.893E 01	0.000	0.000	0.000	3.533E 03	1.479E 01	7.663E+03	1.479E 01	7.663E+03
6.083E 01	1.732E 01	1.732E 01	-5.900E 01	0.000	0.000	0.000	3.790E 03	4.405E 01	2.314E+02	4.405E 01	2.314E+02

ORIGINAL PAGE  
OF POOR QUALITY



READING # 0060 BLOCK # 60 TIME # 178.193 MACH 6.0 PT # 748.749 TT # 2882.5

XASB	P-18	P-08	PDA	QOX	Q-18	Q-08	LAMALL	P-18/P80	P-18/PT0	P-08/P80	P-08/PT0
6.23E 01	1.669E 01	1.669E 01	5.920E 02	-4.110E 03	-1.745E 03	-2.368E 03	3.972E 03	4.300E 01	2.229E-02	4.300E 01	2.229E-02
6.42E 01	2.156E 01	2.156E 01	5.920E 02	-4.350E 03	-1.621E 03	-2.537E 03	4.289E 03	5.555E 01	2.799E-02	5.555E 01	2.799E-02
6.50E 01	2.089E 01	2.089E 01	5.920E 02	-4.400E 03	-1.635E 03	-2.560E 03	4.337E 03	5.303E 01	2.790E-02	5.303E 01	2.790E-02
6.53E 01	2.089E 01	2.238E 01	5.920E 02	-4.405E 03	-1.836E 03	-2.56E 03	4.322E 03	5.333E 01	2.790E-02	5.333E 01	2.790E-02
6.53E 01	1.985E 01	2.277E 01	5.920E 02	-4.427E 03	-1.844E 03	-2.583E 03	4.368E 03	5.115E 01	2.511E-02	5.115E 01	2.511E-02
6.60E 01	1.121E 01	9.380E 00	7.686E 02	-4.505E 03	-1.895E 03	-2.690E 03	4.583E 03	2.889E 01	1.997E-02	2.889E 01	1.997E-02
6.76E 01	8.074E 00	9.330E 00	9.608E 02	-4.638E 03	-1.911E 03	-2.721E 03	4.685E 03	2.801E 01	1.978E-02	2.801E 01	1.978E-02
6.83E 01	4.470E 00	7.000E 00	1.159E 03	-4.697E 03	-1.926E 03	-2.771E 03	4.760E 03	1.152E 01	5.970E-03	1.152E 01	5.970E-03
6.91E 01	3.531E 00	5.015E 00	1.286E 03	-4.752E 03	-1.937E 03	-2.815E 03	4.888E 03	9.099E 00	4.916E-03	9.099E 00	4.916E-03
6.96E 01	2.735E 00	4.135E 00	1.369E 03	-4.797E 03	-1.945E 03	-2.852E 03	4.922E 03	7.088E 00	3.883E-03	7.088E 00	3.883E-03
7.07E 01	1.974E 00	2.765E 00	1.460E 03	-4.862E 03	-1.954E 03	-2.902E 03	5.036E 03	5.088E 00	2.637E-03	5.088E 00	2.637E-03
7.11E 01	1.630E 00	2.582E 00	1.491E 03	-4.888E 03	-1.957E 03	-2.930E 03	5.088E 03	4.201E 00	2.177E-03	4.201E 00	2.177E-03
7.20E 01	1.211E 00	1.930E 00	1.576E 03	-4.956E 03	-1.967E 03	-2.989E 03	5.273E 03	3.121E 00	1.617E-03	3.121E 00	1.617E-03
7.23E 01	1.170E 00	1.997E 00	1.583E 03	-4.961E 03	-1.968E 03	-2.992E 03	5.290E 03	3.015E 00	1.563E-03	3.015E 00	1.563E-03
7.31E 01	1.177E 00	5.300E-01	1.621E 03	-4.990E 03	-1.972E 03	-3.018E 03	5.374E 03	3.034E 00	1.572E-03	3.034E 00	1.572E-03
7.38E 01	1.177E 00	5.300E-01	1.622E 03	-4.990E 03	-1.972E 03	-3.018E 03	5.375E 03	3.034E 00	1.572E-03	3.034E 00	1.572E-03
7.40E 01	1.190E 00	0.000	1.647E 03	-5.047E 03	-1.979E 03	-3.062E 03	5.426E 03	3.067E 00	1.589E-03	3.067E 00	1.589E-03
7.77E 01	2.210E 00	0.000	1.715E 03	-5.089E 03	-1.991E 03	-3.068E 03	5.525E 03	3.095E 00	2.992E-03	3.095E 00	2.992E-03
8.15E 01	1.510E 00	0.000	1.795E 03	-5.072E 03	-2.008E 03	-3.068E 03	5.630E 03	3.091E 00	2.017E-03	3.091E 00	2.017E-03
8.44E 01	1.155E 00	0.000	1.824E 03	-5.084E 03	-2.016E 03	-3.068E 03	5.684E 03	2.977E 00	1.543E-03	2.977E 00	1.543E-03
8.72E 01	1.710E 00	0.000	1.859E 03	-5.104E 03	-2.036E 03	-3.068E 03	5.707E 03	4.807E 00	2.288E-03	4.807E 00	2.288E-03
8.73E 01	1.711E 00	0.000	1.859E 03	-5.104E 03	-2.036E 03	-3.068E 03	5.707E 03	4.807E 00	2.288E-03	4.807E 00	2.288E-03

RESUING = 0060 BLOCK = 80 TIME = 178.193 MACH 6.0 PT = 748.149 TT = 2982.8

X	DDAG	CDAG	CF	HC
4.040E 01	1.143E 02	1.143E 02	2.239E-03	4.460E-02
4.041E 01	1.692E-01	1.145E 02	2.498E-03	3.802E-02
4.134E 01	1.861E 01	1.331E 02	2.694E-03	4.892E-02
4.135E 01	1.674E-01	1.333E 02	2.488E-03	5.214E-02
4.141E 01	1.184E 00	1.345E 02	2.465E-03	5.326E-02
4.150E 01	1.534E 00	1.360E 02	2.477E-03	5.498E-02
4.246E 01	1.682E 01	1.529E 02	2.568E-03	5.895E-02
4.413E 01	2.620E 01	1.791E 02	2.702E-03	7.191E-02
4.480E 01	7.139E 00	1.887E 02	2.921E-03	6.745E-02
4.485E 01	7.103E-01	1.894E 02	2.927E-03	6.725E-02
4.625E 01	1.996E 01	2.094E 02	3.255E-03	6.140E-02
4.626E 01	1.342E-01	2.095E 02	2.859E-03	7.104E-02
4.731E 01	1.246E 01	2.220E 02	2.832E-03	7.053E-02
4.737E 01	7.277E-01	2.227E 02	2.926E-03	6.802E-02
4.811E 01	8.284E 00	2.310E 02	2.908E-03	6.695E-02
4.881E 01	6.282E 00	2.393E 02	3.202E-03	5.711E-02
4.935E 01	1.199E-01	2.394E 02	2.880E-03	6.410E-02
5.076E 01	5.971E 00	2.454E 02	2.824E-03	6.140E-02
5.286E 01	1.500E 01	2.604E 02	2.786E-03	5.620E-02
5.336E 01	4.967E 00	2.862E 02	2.916E-03	4.092E-02
5.411E 01	7.481E 00	2.937E 02	2.892E-03	3.862E-02
5.487E 01	7.369E 00	3.010E 02	2.877E-03	3.537E-02
5.576E 01	8.311E 00	3.093E 02	2.851E-03	3.361E-02
5.630E 01	3.041E 00	3.124E 02	2.823E-03	3.043E-02
5.635E 01	4.239E-01	3.120E 02	2.993E-03	2.480E-02
5.649E 01	1.107E 00	3.130E 02	2.824E-03	2.590E-02
5.657E 01	4.497E-01	3.146E 02	3.277E-03	2.597E-02
5.685E 01	2.272E 00	3.160E 02	2.981E-03	2.746E-02
5.708E 01	1.764E 00	3.186E 02	2.961E-03	2.735E-02
5.780E 01	3.715E 00	3.243E 02	2.912E-03	2.540E-02
5.882E 01	8.490E 00	3.328E 02	2.824E-03	1.646E-02
6.083E 01	1.495E 01	3.477E 02	2.555E-03	3.690E-02
6.225E 01	1.012E 01	3.579E 02	3.109E-03	2.990E-02
6.472E 01	1.796E 01	3.750E 02	3.156E-03	3.226E-02
6.509E 01	2.374E 00	3.782E 02	3.326E-03	2.958E-02
6.513E 01	2.459E-01	3.784E 02	3.412E-03	3.013E-02
6.533E 01	1.250E 00	3.797E 02	3.408E-03	3.005E-02
6.699E 01	1.090E 01	3.908E 02	3.267E-03	2.207E-02
6.766E 01	4.154E 00	3.947E 02	3.240E-03	2.000E-02
6.843E 01	4.390E 00	3.991E 02	3.179E-03	1.543E-02
6.915E 01	3.531E 00	4.027E 02	3.134E-03	1.256E-02
6.976E 01	2.627E 00	4.053E 02	3.104E-03	1.077E-02
7.071E 01	3.486E 00	4.088E 02	3.052E-03	8.29E-03
7.114E 01	1.380E 00	4.102E 02	3.034E-03	7.501E-03
7.267E 01	4.342E 00	4.145E 02	2.995E-03	6.046E-03
7.282E 01	3.609E-01	4.149E 02	2.981E-03	5.640E-03
7.357E 01	1.476E 00	4.163E 02	2.986E-03	5.762E-03
7.358E 01	2.368E-03	4.163E 02	2.906E-03	3.771E-03
7.490E 01	8.464E-01	4.172E 02	2.944E-03	4.874E-03
7.775E 01	2.163E 00	4.193E 02	3.013E-03	7.728E-03
8.165E 01	2.452E 00	4.218E 02	2.941E-03	5.770E-03
8.446E 01	1.039E 00	4.228E 02	2.892E-03	4.840E-03
8.732E 01	4.479E-01	4.233E 02	2.932E-03	6.277E-03
8.733E 01	0.000	4.233E 02	2.932E-03	6.281E-03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... 1375. (LBF)  
 MEASURED THRUST..... 1484. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1617. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1600. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5502  
 MEASURED THRUST COEFFICIENT..... 0.5935

REGENERATIVE=COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 6502. (LBF)  
 NET THRUST..... 1484. (LBF)  
 SPECIFIC IMPULSE..... 1600. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.5946

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 114.2 (LBF)  
 INLET MOMENTUM CHANGE..... -757.6 (LBF)  
 COMBUSTOR FRICTION DRAG..... 263.9 (LBF)  
 COMBUSTOR STRUT DRAG..... -17.39 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 911. (LBF)  
 NOZZLE FRICTION DRAG..... 45.09 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1222. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1267. (LBF)  
 EXTERNAL FRICTION DRAG..... 45.23 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1037. (LBF)  
 TOTAL EXTERNAL DRAG..... -1082. (LBF)  
 TOTAL STRUT DRAG..... -17.39 (LBF)  
 CAVITY FORCE..... -1081. (LBF)  
 CALCULATED LOAD CELL FORCE..... -786. (LBF)  
 MEASURED LOAD CELL FORCE..... -680. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0, 0.0, -134.5, -119.1.

INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9831  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIFTING PRESSURE RECOVERY EFFICIENCY..... 0.1614  
 DELTA PT2..... 0.1205 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3652  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1638  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8881  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9036  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9410  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8940  
 ENTHALPY AT P0 = SUPERSONIC..... -1.66 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 31.09 (BTU/LBM)

COMBUSTOR

FUEL=AIR RATIO..... 0.0263  
 EQUIVALENCE RATIO..... 0.850  
 COMBUSTOR EFFICIENCY..... 0.768  
 TOTAL PRESSURE RATIO..... 0.1477  
 COMBUSTOR EFFECTIVENESS..... 0.7485  
 INJECTOR DISCHARGE COEFFICIENTS 0.8366, 0.6953, 0.7757, 0.7028

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9473  
 NOZZLE COEFFICIENT = CT..... 0.8677  
 PROCESS EFFICIENCY..... 0.8784  
 KINETIC ENERGY EFFICIENCY..... 0.8615

STATIONS

NOMINAL COPL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3587 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COPL LEADING EDGE..... 35.239 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.579 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.331 (IN)  
 STRUT LEADING EDGE..... 56.095 (IN)  
 STRUT TRAILING EDGE..... 65.095 (IN)  
 COMBUSTOR EXIT..... 65.095 (IN)

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.340	B
1C	44.300	C
2A	48.815	B
2C	46.250	
3A	54.105	
3B	56.290	
4	44.840	

Reading 60

$t = 186,29 \text{ sec.}$

SUMMARY REPORT

	P	T	M	S	GAMMA	MOLWT	BONV	MACH	VEL	S	A/A	N	A/AC	MURTH	O	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5															
0.000	747.499	2981	663.7	(789)	1.2933	28.966	2572											
0.000	0.387	403	32.1	(97)	1.3088	28.965	984	5.997	5901	1.825	0.10620	26.803	0.9854	5014	9.739	187.0		
SPIKE TIP N8	2	0	4															
0.600	18.063	2963	663.7	(789)	1.2932	28.965	2572											
0.600	18.355	2914	643.4	(789)	1.2934	28.965	2545	0.397	1009	2.081	0.10620	26.803	0.9854	4969	1.666	185.4		
WIND TUNNEL	3	0	0															
0.000	747.499	2981	663.7	(789)	1.2933	28.966	2572											
0.000	0.381	401	32.8	(96)	1.3088	28.965	982	6.013	5903	1.825	0.10503	26.807	0.9854	4959	9.634	187.1		
SPIKE TIP N3	4	0	0															
0.600	18.087	2981	663.7	(789)	1.2932	28.965	2572											
0.600	18.399	2915	643.9	(770)	1.2953	28.965	2506	0.391	996	2.081	0.10503	26.807	0.9854	4960	1.626	187.1		
INLET THROAT	5	0	4															
40.400	280.250	2927	647.3	(773)	1.2950	28.966	2551											
40.400	16.032	1457	230.7	(360)	1.3503	28.965	1838	2.085	4566	1.887	0.94173	26.803	0.1111	4260	68.822	158.9		
INLET UPNRSK	6	0	3															
40.400	280.250	2927	647.3	(773)	1.2950	28.966	2551											
40.400	13.762	1400	219.8	(345)	1.3536	28.965	1804	2.376	4647	1.887	0.85612	26.803	0.1222	4302	61.828	160.5		
INLET DNRSK	7	0	4															
40.400	122.024	2927	647.3	(773)	1.2980	28.966	2551											
40.400	108.988	2825	616.9	(743)	1.2983	28.966	2509	0.492	1234	1.944	0.85612	26.803	0.1222	4302	16.416	160.5		
COMBUSTOR	8	0	1	21														
40.410	236.281	2891	649.4	(793)	1.2973	27.793	2500											
40.410	13.361	1400	219.2	(366)	1.3532	27.793	1839	2.496	4639	1.963	0.94475	26.892	0.1111	4259	68.116	158.4	0.10	0.07
COMBUSTOR	9	0	2	21														
41.310	171.589	2821	653.1	(808)	1.3012	26.468	2626											
41.310	19.147	1683	291.8	(450)	1.3431	26.468	2082	2.082	4252	2.056	0.94970	26.999	0.1110	4112	62.756	152.3	0.22	0.08
COMBUSTOR	10	0	3	21														
41.320	179.489	2775	653.1	(794)	1.3034	26.420	2609											
41.320	19.211	1604	292.4	(436)	1.3459	26.419	2016	2.107	4248	2.048	0.95047	26.999	0.1109	4111	62.752	152.3	0.22	0.01
COMBUSTOR	11	0	4	21														
41.385	177.792	2767	652.8	(792)	1.3038	26.413	2606											
41.385	19.628	1612	296.8	(438)	1.3456	26.412	2021	2.089	4220	2.048	0.95042	26.999	0.1109	4099	62.336	151.6	0.22	0.00
COMBUSTOR	12	0	5	21														
41.500	173.409	2764	652.2	(791)	1.3039	26.411	2605											
41.500	20.942	1648	307.6	(449)	1.3439	26.411	2042	2.034	4152	2.049	0.95188	26.999	0.1107	4079	61.427	151.1	0.22	0.00
COMBUSTOR	13	0	6	21														
42.460	146.920	2746	646.2	(785)	1.3048	26.411	2597											
42.460	23.622	1759	340.6	(482)	1.3389	26.411	2106	1.857	3911	2.059	0.94247	26.999	0.1116	3958	57.278	146.6	0.22	0.00
COMBUSTOR	14	0	7	5														
44.105	112.104	3010	633.5	(865)	1.2917	26.734	2889											
44.105	36.644	2323	413.9	(649)	1.3147	26.735	2383	1.391	3315	2.102	0.90953	26.999	0.1159	3875	46.850	143.5	0.22	0.26
COMBUSTOR	15	0	8	3														
44.310	110.365	3026	631.7	(870)	1.2908	26.758	2894											
44.310	37.982	2363	419.1	(641)	1.3130	26.759	2401	1.359	3262	2.104	0.90787	26.999	0.1161	3866	46.018	143.2	0.22	0.27
COMBUSTOR	16	0	9	3														
44.800	106.914	3058	627.2	(879)	1.2891	26.808	2704											
44.800	40.699	2448	430.7	(686)	1.3096	26.809	2438	1.286	3135	2.108	0.90431	26.999	0.1166	3846	44.063	142.5	0.22	0.31
COMBUSTOR	17	0	10	2														
44.820	106.805	3058	627.0	(879)	1.2891	26.809	2704											
44.820	40.767	2449	431.0	(687)	1.3095	26.809	2439	1.284	3131	2.108	0.90418	26.999	0.1166	3845	43.999	142.4	0.22	0.31
COMBUSTOR	18	0	11	6														
46.250	96.936	2814	627.9	(878)	1.3019	24.301	2738											
46.250	45.740	2357	469.4	(721)	1.3175	24.301	2520	1.117	2816	2.250	0.85948	27.222	0.1237	3831	37.610	140.7	0.47	0.12

READING = 0060 BLOCK = 89 TIME = 106.203 MACH 6.0 PT = 747.409 TT = 2981.0

P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MUPTM	U	IVAC	Phi	ETAC
COMBUSTOR	0	19	12	2												
46.260	96.691	2816	627.6	( 878)	1.3018	24.303	2739									
46.260	45.774	2359	469.4	( 722)	1.3172	24.303	2521	1.116	2815	2.251	0.65897	27.222	0.1237	3832	37.571	140.8 0.47 0.13
COMBUSTOR	0	20	13	4												
47.310	91.838	2999	616.4	( 938)	1.2929	24.314	2804									
47.310	49.425	2600	476.0	( 800)	1.3063	24.314	2625	1.010	2651	2.270	0.79932	27.222	0.1330	3926	32.927	144.2 0.47 0.22
COMBUSTOR	0	21	14	3												
47.345	91.647	3009	616.1	( 941)	1.2924	24.324	2808									
47.345	49.671	2613	476.7	( 805)	1.3057	24.325	2630	1.004	2640	2.271	0.79636	27.222	0.1334	3931	32.685	144.4 0.47 0.22
COMBUSTOR	0	22	15	4												
48.110	87.815	3168	608.3	( 933)	1.2848	24.702	2860									
48.110	49.782	2784	472.6	( 860)	1.2977	24.703	2696	0.966	2605	2.285	0.74474	27.222	0.1427	4024	30.151	147.8 0.67 0.30
COMBUSTOR	0	23	16	8												
48.785	82.688	2764	622.3	( 971)	1.3059	21.454	2892									
48.785	37.707	2290	438.5	( 789)	1.3221	21.454	2648	1.145	3033	2.491	0.69369	27.575	0.1552	4098	32.697	148.6 0.87 0.12
COMBUSTOR	0	24	17	2												
48.795	82.836	2764	622.3	( 972)	1.3058	21.456	2892									
48.795	37.622	2291	437.9	( 789)	1.3220	21.456	2648	1.147	3037	2.491	0.69278	27.575	0.1554	4100	32.695	148.7 0.87 0.12
COMBUSTOR	0	25	18	4												
49.325	80.342	2856	617.8	(1005)	1.3015	21.531	2928									
49.325	33.129	2315	407.3	( 766)	1.3200	21.531	2655	1.223	3246	2.502	0.64792	27.575	0.1662	4192	32.682	152.0 0.87 0.15
COMBUSTOR	0	26	19	6												
50.735	71.788	3217	607.1	(1100)	1.2840	21.893	3035									
50.735	30.975	2658	383.4	( 921)	1.3032	21.894	2805	1.193	3345	2.844	0.59220	27.575	0.1950	4414	28.708	160.1 0.87 0.25
COMBUSTOR	0	27	20	4												
52.835	66.488	3447	593.3	(1226)	1.2718	22.135	3138									
52.835	21.600	2685	285.0	( 926)	1.2988	22.139	2799	1.403	3928	2.567	0.45259	27.575	0.2379	4682	27.626	169.8 0.87 0.33
COMBUSTOR	0	28	21	4												
53.335	64.739	3517	590.4	(1233)	1.2680	22.207	3160									
53.335	20.758	2738	273.3	( 945)	1.2960	22.213	2818	1.413	3963	2.574	0.43410	27.575	0.2480	4732	26.871	171.6 0.87 0.35
COMBUSTOR	0	29	22	4												
54.085	63.492	3558	586.2	(1268)	1.2656	22.256	3172									
54.085	18.718	2722	245.2	( 938)	1.2958	22.263	2807	1.472	4130	2.578	0.40919	27.575	0.2631	4801	26.266	174.1 0.87 0.36
COMBUSTOR	0	30	23	3												
54.845	62.992	3565	582.1	(1271)	1.2651	22.271	3173									
54.845	16.650	2661	214.4	( 914)	1.2977	22.279	2776	1.545	4289	2.579	0.38696	27.575	0.2782	4863	25.794	176.3 0.87 0.37
COMBUSTOR	0	31	24	4												
55.760	61.124	3623	577.6	(1293)	1.2617	22.338	3190									
55.760	15.333	2679	192.0	( 920)	1.2962	22.347	2779	1.580	4392	2.585	0.36356	27.575	0.2961	4928	24.617	178.7 0.87 0.39
COMBUSTOR	0	32	25	5												
56.270	48.048	4053	575.2	(1358)	1.2337	22.772	3304									
56.270	14.599	3192	199.9	(110)	1.2710	22.808	2974	1.437	4334	2.631	0.29260	27.575	0.3679	5090	19.707	184.6 0.87 0.52
COMBUSTOR	0	33	26	5												
56.325	55.175	3698	575.0	(1321)	1.2570	22.416	3211									
56.325	11.122	2610	130.4	( 892)	1.2975	22.429	2740	1.722	4717	2.598	0.29172	27.575	0.3691	5094	21.385	184.7 0.87 0.41
COMBUSTOR	0	34	27	3												
56.465	55.046	3705	574.4	(1324)	1.2566	22.424	3213									
56.465	11.022	2612	127.4	( 892)	1.2973	22.437	2740	1.726	4729	2.599	0.28973	27.575	0.3716	5102	21.294	185.0 0.87 0.41
COMBUSTOR	0	35	28	6												
56.545	48.939	4039	574.1	(1352)	1.2348	22.759	3301									
56.545	14.203	3146	187.2	(1093)	1.2730	22.794	2956	1.449	4400	2.628	0.29297	27.575	0.3675	5108	20.031	185.2 0.87 0.52
COMBUSTOR	0	36	29	3												
56.825	49.606	4027	572.9	(1347)	1.2357	22.750	3298									
56.825	13.800	3107	175.7	(1078)	1.2747	22.784	2940	1.516	4458	2.626	0.29195	27.575	0.3688	5124	20.226	185.8 0.87 0.51
COMBUSTOR	0	37	30	3												
57.051	50.496	3997	571.9	(1336)	1.2378	22.722	3290									
57.051	13.321	3044	163.3	(1053)	1.2775	22.753	2915	1.551	4522	2.623	0.29140	27.575	0.3695	5136	20.477	186.3 0.87 0.50

READING = 0060 BLOCK = 89 TIME = 186.293 MACH 6.0 PT = 747.499 TT = 2981.0

	P	T	M	GAUSS	MOLWT	SONV	MACH	VEL	S	W/A	N	A/AC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	36	31	4													
57.775	53.198	3888	569.01(1394)	1.2451	22.618	3262											
57.775	11.787	2833	126.6( 973)	1.2887	22.642	2829	1.663	4705	2.612	0.2888	27.575	0.3753	5166	20.977	187.3	0.87	0.47
COMBUSTOR	0	39	32	8													
58.795	90.392	3090	365.5(1090)	1.2890	21.871	3009											
58.795	5.850	1564	-13.6( 516)	1.3484	21.872	2188	2.461	5383	2.501	0.28506	27.575	0.3777	5180	23.847	187.8	0.87	0.25
COMBUSTOR	0	40	33	6													
60.805	46.489	4429	559.3(1602)	1.2049	23.206	3381											
60.805	17.978	3741	227.7(1320)	1.2391	23.294	3145	1.295	4073	2.648	0.29498	27.575	0.3650	5171	18.671	187.5	0.87	0.66
COMBUSTOR	0	41	34	4													
62.225	49.122	4290	554.5(1548)	1.2181	23.069	3353											
62.225	16.644	3502	192.2(1127)	1.2534	23.134	3071	1.386	4258	2.637	0.30297	27.575	0.3553	5164	20.046	187.3	0.87	0.61
COMBUSTOR	0	42	35	5													
64.689	43.449	4399	585.3(1668)	1.1897	23.426	3408											
64.689	21.329	4108	286.6(1464)	1.2140	23.538	3246	1.108	3598	2.658	0.28718	27.575	0.3749	5150	16.056	186.8	0.87	0.73
COMBUSTOR	0	43	36	4													
65.065	40.194	4829	543.7(1680)	1.1859	23.464	3411											
65.065	21.343	4200	311.1(1500)	1.2089	23.577	3269	1.043	3411	2.666	0.28698	27.575	0.4032	5149	14.134	186.7	0.87	0.75
COMBUSTOR	0	44	37	21													
65.065	40.194	4755	626.1(1733)	1.1779	23.398	3450											
65.065	21.375	4237	386.6(1558)	1.1970	23.537	3312	1.046	3462	2.683	0.28698	27.575	0.4032	5196	14.365	188.4	0.87	0.75
NOZZLE	AE	45	38	5													
67.301	40.194	4829	543.7(1650)	1.1859	23.464	3411											
67.301	1.191	2344	-874.1( 770)	1.2916	23.672	2821	2.830	7136	2.666	0.03558	27.575	1.9371	6708	6.164	243.2	0.87	0.75
NOZZLE	PO	46	39	5													
67.301	40.194	4829	543.7(1650)	1.1859	23.464	3411											
67.301	0.287	1905	-888.9( 575)	1.3143	23.672	2232	3.490	7790	2.666	0.02560	27.575	4.2080	7093	3.099	257.2	0.87	0.75
NOZZLE	AE	47	40	9													
67.301	40.194	4755	626.1(1733)	1.1779	23.398	3450											
67.301	1.281	2379	-823.5( 820)	1.2865	23.671	2868	2.801	7247	2.683	0.03558	27.575	1.9371	6827	6.260	247.6	0.87	0.75
NOZZLE	PU	48	41	5													
67.301	40.194	4755	626.1(1733)	1.1779	23.398	3450											
67.301	0.287	1997	-836.5( 607)	1.3099	23.672	2284	3.479	7949	2.683	0.02488	27.575	4.3322	7242	3.070	262.6	0.87	0.75
PCTIVE	COMBUSTOR	49	61	0													
65.065	480.280	5308	543.7(1947)	1.1670	24.216	3564											
65.065	0.287	1878	-1193.5( 449)	1.3220	24.691	1970	4.656	9216	2.512	0.03873	27.575	2.7800	8174	5.546	286.4	0.87	1.00
PCTIVE	NOZZLE	69	62	0													
67.301	25.980	4553	517.4(1852)	1.1836	23.458	3383											
67.301	1.466	2865	-352.4( 890)	1.2798	23.671	2676	2.468	6597	2.697	0.03558	27.575	1.9371	6381	3.698	231.4	0.87	0.75

ORIGINAL PAGE IS  
OF POOR QUALITY

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READING 0060 BLOCK 69 TIME 186.293 MACM 6.0 PT = 747.499 IT = 2981.0

XAB8	P=18	P=08	PDA	QOX	W=18	G=08	CANALL	P=IRV450	P=18/P10	P=08/P80	P=08/P10
6.981E-01	1.065E 00	0.000	-4.407E-01	0.000	0.000	0.000	2.470E-02	2.751E 00	1.425E-03	0.000	0.000
1.836E 01	1.065E 00	0.000	-3.546E 01	0.000	0.000	0.000	1.654E 02	2.751E 00	1.425E-03	0.000	0.000
3.070E 01	2.205E 00	0.000	-1.680E 00	0.000	0.000	0.000	5.053E 02	5.696E 00	2.950E-03	0.000	0.000
1.508E 01	5.932E 00	0.000	-3.669E 02	0.000	0.000	0.000	6.804E 02	1.016E 01	5.260E-03	0.000	0.000
3.520E 01	3.958E 00	0.000	-4.337E 02	0.000	0.000	0.000	6.858E 02	1.022E 01	5.260E-03	0.000	0.000
3.521E 01	3.959E 00	0.000	-4.337E 02	0.000	0.000	0.000	6.861E 02	1.023E 01	5.260E-03	0.000	0.000
3.555E 01	4.030E 00	0.000	-4.417E 02	0.000	0.000	0.000	7.203E 02	1.041E 01	5.391E-03	0.000	0.000
3.587E 01	4.008E 00	0.000	-4.582E 02	0.000	0.000	0.000	7.533E 02	1.035E 01	5.361E-03	0.000	0.000
3.586E 01	3.995E 00	0.000	-4.692E 02	0.000	0.000	0.000	7.723E 02	1.032E 01	5.361E-03	0.000	0.000
3.648E 01	4.223E 00	0.000	-4.909E 02	0.000	0.000	0.000	8.159E 02	1.091E 01	5.650E-03	0.000	0.000
3.701E 01	4.235E 00	0.000	-5.160E 02	0.000	0.000	0.000	8.719E 02	1.094E 01	5.666E-03	0.000	0.000
3.803E 01	3.785E 00	0.000	-5.303E 02	0.000	0.000	0.000	9.828E 02	1.057E 01	5.064E-03	0.000	0.000
3.835E 01	3.737E 00	0.000	-5.437E 02	0.000	0.000	0.000	1.019E 03	1.375E 01	7.119E-03	0.000	0.000
3.875E 01	3.517E 00	0.000	-5.437E 02	0.000	0.000	0.000	1.064E 03	1.857E 01	9.619E-03	0.000	0.000
3.901E 01	3.510E 00	0.000	-5.437E 02	0.000	0.000	0.000	1.072E 03	1.949E 01	1.009E-02	0.000	0.000
3.902E 01	3.544E 00	0.000	-5.437E 02	0.000	0.000	0.000	1.093E 03	2.175E 01	1.126E-02	0.000	0.000
3.933E 01	1.805E 01	0.000	-5.437E 02	0.000	0.000	0.000	1.131E 03	3.629E 01	1.880E-02	0.000	0.000
3.950E 01	1.691E 01	0.000	-5.437E 02	0.000	0.000	0.000	1.150E 03	4.369E 01	2.263E-02	0.000	0.000
3.952E 01	1.754E 01	0.000	-5.437E 02	0.000	0.000	0.000	1.188E 03	4.532E 01	2.347E-02	0.000	0.000
4.000E 01	1.788E 01	0.000	-5.989E 02	0.000	0.000	0.000	1.200E 03	4.620E 01	2.393E-02	0.000	0.000
4.032E 01	2.192E 01	0.000	-6.337E 02	0.000	0.000	0.000	1.246E 03	5.662E 01	2.933E-02	0.000	0.000
4.002E 01	2.286E 01	0.000	-6.427E 02	0.000	0.000	0.000	1.255E 03	5.904E 01	3.058E-02	0.000	0.000
4.001E 01	2.298E 01	0.000	-6.438E 02	0.000	0.000	0.000	1.255E 03	5.936E 01	3.074E-02	0.000	0.000
4.131E 01	3.416E 01	0.000	-7.731E 02	0.000	0.000	0.000	1.363E 03	8.824E 01	4.570E-02	0.000	0.000
4.132E 01	3.429E 01	0.000	-7.737E 02	0.000	0.000	0.000	1.364E 03	8.856E 01	4.587E-02	0.000	0.000
4.133E 01	3.509E 01	0.000	-7.841E 02	0.000	0.000	0.000	1.372E 03	9.065E 01	4.695E-02	0.000	0.000
4.330E 01	3.535E 01	0.000	-8.026E 02	0.000	0.000	0.000	1.385E 03	9.435E 01	4.806E-02	0.000	0.000
4.262E 01	3.191E 01	0.000	-9.058E 02	0.000	0.000	0.000	1.500E 03	8.243E 01	4.269E-02	0.000	0.000
4.101E 01	4.127E 01	0.000	-9.624E 02	0.000	0.000	0.000	1.699E 03	1.066E 02	5.521E-02	0.000	0.000
4.331E 01	4.244E 01	0.000	-9.678E 02	0.000	0.000	0.000	1.724E 03	1.096E 02	5.677E-02	0.000	0.000
4.480E 01	4.522E 01	0.000	-9.807E 02	0.000	0.000	0.000	1.784E 03	1.168E 02	6.050E-02	0.000	0.000
4.482E 01	4.526E 01	0.000	-9.810E 02	0.000	0.000	0.000	1.786E 03	1.169E 02	6.054E-02	0.000	0.000
4.625E 01	4.749E 01	0.000	-9.390E 02	0.000	0.000	0.000	1.962E 03	1.226E 02	6.352E-02	0.000	0.000
4.626E 01	4.806E 01	0.000	-9.379E 02	0.000	0.000	0.000	1.963E 03	1.227E 02	6.354E-02	0.000	0.000
4.731E 01	4.912E 01	0.000	-9.309E 02	0.000	0.000	0.000	2.094E 03	1.269E 02	6.572E-02	0.000	0.000
4.734E 01	4.943E 01	0.000	-8.250E 02	0.000	0.000	0.000	2.096E 03	1.277E 02	6.613E-02	0.000	0.000
4.811E 01	5.614E 01	0.000	-7.239E 02	0.000	0.000	0.000	2.193E 03	1.450E 02	7.510E-02	0.000	0.000
4.878E 01	3.771E 01	0.000	-5.982E 02	0.000	0.000	0.000	2.278E 03	9.740E 01	5.044E-02	0.000	0.000
4.879E 01	3.762E 01	0.000	-5.982E 02	0.000	0.000	0.000	2.279E 03	9.740E 01	5.044E-02	0.000	0.000
4.932E 01	3.313E 01	0.000	-5.962E 02	0.000	0.000	0.000	2.279E 03	9.718E 01	5.033E-02	0.000	0.000
4.933E 01	3.313E 01	0.000	-5.962E 02	0.000	0.000	0.000	2.279E 03	9.718E 01	5.033E-02	0.000	0.000
5.073E 01	3.097E 01	0.000	-2.615E 02	0.000	0.000	0.000	2.345E 03	8.598E 01	4.432E-02	0.000	0.000
5.263E 01	2.160E 01	0.000	-2.789E 01	0.000	0.000	0.000	2.523E 03	8.001E 01	4.144E-02	0.000	0.000
5.333E 01	2.076E 01	0.000	-2.789E 01	0.000	0.000	0.000	2.853E 03	5.579E 01	2.890E-02	0.000	0.000
5.333E 01	2.076E 01	0.000	-2.789E 01	0.000	0.000	0.000	2.853E 03	5.579E 01	2.890E-02	0.000	0.000
5.408E 01	1.872E 01	0.000	-1.593E 02	0.000	0.000	0.000	2.949E 03	4.632E 01	2.504E-02	0.000	0.000
5.408E 01	1.872E 01	0.000	-1.593E 02	0.000	0.000	0.000	2.949E 03	4.632E 01	2.504E-02	0.000	0.000
5.574E 01	1.533E 01	0.000	-2.279E 01	0.000	0.000	0.000	3.046E 03	4.301E 01	2.227E-02	0.000	0.000
5.687E 01	1.600E 01	0.000	-3.013E 02	0.000	0.000	0.000	3.164E 03	3.941E 01	2.051E-02	0.000	0.000
5.632E 01	1.452E 01	0.000	-4.669E 02	0.000	0.000	0.000	3.209E 03	3.771E 01	1.953E-02	0.000	0.000
5.646E 01	1.432E 01	0.000	-4.710E 02	0.000	0.000	0.000	3.216E 03	3.751E 01	1.942E-02	0.000	0.000
5.654E 01	1.420E 01	0.000	-4.804E 02	0.000	0.000	0.000	3.234E 03	3.692E 01	1.915E-02	0.000	0.000
5.682E 01	1.420E 01	0.000	-4.862E 02	0.000	0.000	0.000	3.244E 03	3.669E 01	1.900E-02	0.000	0.000
5.682E 01	1.380E 01	0.000	-5.044E 02	0.000	0.000	0.000	3.280E 03	3.565E 01	1.846E-02	0.000	0.000
5.735E 01	1.332E 01	0.000	-5.176E 02	0.000	0.000	0.000	3.309E 03	3.441E 01	1.782E-02	0.000	0.000
5.777E 01	1.179E 01	0.000	-5.517E 02	0.000	0.000	0.000	3.402E 03	3.045E 01	1.577E-02	0.000	0.000
5.879E 01	5.850E 00	0.000	-5.721E 02	0.000	0.000	0.000	3.532E 03	1.511E 01	7.826E-03	0.000	0.000
6.002E 01	1.797E 01	0.000	-5.749E 02	0.000	0.000	0.000	3.790E 03	4.643E 01	2.405E-02	0.000	0.000



MAB	P=18	P=08	PDA	QOX	U=18	Q=08	CWALL	P=18/P80	P=18/P10	P=08/P80	P=08/P10
6.22E 01	1.664E 01	1.664E 01	5.749E 02	-4.213E 03	-1.856E 03	-2.357E 03	3.972E 03	4.299E 01	2.227E-02	4.299E 01	2.227E-02
6.46E 01	2.153E 01	2.153E 01	5.749E 02	-4.468E 03	-1.934E 03	-2.533E 03	4.289E 03	5.51E 01	2.800E-02	5.51E 01	2.800E-02
6.50E 01	2.081E 01	2.081E 01	5.749E 02	-4.511E 03	-1.948E 03	-2.562E 03	4.337E 03	5.376E 01	2.784E-02	5.376E 01	2.784E-02
6.53E 01	2.081E 01	2.081E 01	5.749E 02	-4.511E 03	-1.950E 03	-2.565E 03	4.342E 03	5.376E 01	2.784E-02	5.376E 01	2.784E-02
6.53E 01	1.980E 01	2.275E 01	5.749E 02	-4.534E 03	-1.957E 03	-2.580E 03	4.366E 03	5.114E 01	2.649E-02	5.077E 01	3.043E-02
6.60E 01	1.119E 01	9.500E 00	7.520E 02	-4.699E 03	-2.009E 03	-2.692E 03	4.593E 03	2.982E 01	1.524E-02	2.454E 01	1.271E-02
6.70E 01	6.210E 00	9.555E 00	9.461E 02	-4.752E 03	-2.025E 03	-2.727E 03	4.695E 03	2.121E 01	1.098E-02	2.191E 01	1.238E-02
6.80E 01	4.555E 00	7.054E 00	1.145E 03	-4.811E 03	-2.041E 03	-2.771E 03	4.700E 03	1.177E 01	6.094E-03	1.022E 01	9.436E-03
6.91E 01	3.594E 00	4.995E 00	1.274E 03	-4.867E 03	-2.052E 03	-2.812E 03	4.848E 03	9.284E 00	4.808E-03	1.890E 01	6.662E-03
6.97E 01	2.780E 00	4.140E 00	1.397E 03	-4.913E 03	-2.060E 03	-2.852E 03	4.922E 03	7.101E 00	3.719E-03	1.072E 01	5.550E-03
7.04E 01	2.034E 00	2.630E 00	1.449E 03	-4.960E 03	-2.069E 03	-2.910E 03	5.038E 03	5.234E 00	2.711E-03	7.310E 00	3.786E-03
7.11E 01	1.688E 00	2.034E 00	1.461E 03	-5.007E 03	-2.073E 03	-2.934E 03	5.088E 03	4.332E 00	2.284E-03	6.803E 00	3.523E-03
7.26E 01	1.216E 00	1.935E 00	1.568E 03	-5.078E 03	-2.083E 03	-2.992E 03	5.271E 03	3.111E 00	1.565E-03	4.998E 00	2.589E-03
7.27E 01	1.110E 00	1.706E 00	1.574E 03	-5.083E 03	-2.084E 03	-2.992E 03	5.290E 03	3.022E 00	1.527E-03	4.998E 00	2.589E-03
7.35E 01	1.195E 00	5.000E-01	1.613E 03	-5.113E 03	-2.088E 03	-3.022E 03	5.374E 03	3.071E 00	1.599E-03	1.447E 00	7.492E-04
7.35E 01	1.195E 00	5.339E-01	1.614E 03	-5.113E 03	-2.088E 03	-3.022E 03	5.374E 03	3.071E 00	1.599E-03	1.447E 00	7.492E-04
7.48E 01	1.202E 00	0.000	1.640E 03	-5.172E 03	-2.095E 03	-3.077E 03	5.426E 03	3.088E 00	1.599E-03	1.431E 00	0.000
7.77E 01	2.100E 00	0.000	1.709E 03	-5.186E 03	-2.109E 03	-3.077E 03	5.525E 03	3.293E 00	2.030E-03	0.000	0.000
8.10E 01	1.910E 00	0.000	1.788E 03	-5.200E 03	-2.123E 03	-3.077E 03	5.630E 03	3.900E 00	2.020E-03	0.000	0.000
8.44E 01	1.715E 00	0.000	1.818E 03	-5.214E 03	-2.137E 03	-3.077E 03	5.684E 03	3.035E 00	1.572E-03	0.000	0.000
8.78E 01	1.755E 00	0.000	1.832E 03	-5.236E 03	-2.159E 03	-3.077E 03	5.707E 03	4.456E 00	2.308E-03	0.000	0.000
8.73E 01	1.738E 00	0.000	1.853E 03	-5.236E 03	-2.159E 03	-3.077E 03	5.707E 03	4.456E 00	2.308E-03	0.000	0.000

READING # 0060 BLOCK # 89 TIME # 186.293 MACH 6.0 PI # 707.499 TI = 2081.0

X	UDRAG	CDRAG	CF	HC
4.040E 01	1.133E 02	1.133E 02	2.218E-03	4.375E-02
4.041E 01	1.874E-01	1.133E 02	2.407E-03	3.718E-02
4.131E 01	1.802E 01	1.315E 02	2.607E-03	4.656E-02
4.132E 01	1.686E-01	1.317E 02	2.402E-03	4.982E-02
4.138E 01	1.189E 00	1.329E 02	2.434E-03	5.091E-02
4.150E 01	2.072E 00	1.340E 02	2.449E-03	5.294E-02
4.246E 01	1.696E 01	1.519E 02	2.526E-03	5.502E-02
4.410E 01	2.669E 01	1.786E 02	2.624E-03	6.764E-02
4.431E 01	3.138E 00	1.817E 02	2.799E-03	6.432E-02
4.480E 01	7.563E 00	1.893E 02	2.817E-03	6.823E-02
4.482E 01	3.022E-01	1.896E 02	2.841E-03	6.402E-02
4.625E 01	2.147E 01	2.111E 02	3.148E-03	6.199E-02
4.626E 01	1.407E-01	2.112E 02	2.852E-03	6.899E-02
4.731E 01	1.307E 01	2.243E 02	2.846E-03	6.936E-02
4.734E 01	4.091E-01	2.247E 02	2.946E-03	6.861E-02
4.811E 01	8.811E 00	2.335E 02	2.935E-03	6.574E-02
4.878E 01	8.235E 00	2.417E 02	3.272E-03	5.403E-02
4.879E 01	1.251E-01	2.419E 02	2.844E-03	6.349E-02
4.932E 01	6.120E 00	2.480E 02	2.788E-03	6.025E-02
5.073E 01	1.511E 01	2.631E 02	2.758E-03	5.644E-02
5.283E 01	2.079E 01	2.839E 02	2.788E-03	4.436E-02
5.333E 01	4.927E 00	2.888E 02	2.889E-03	4.144E-02
5.408E 01	7.331E 00	2.942E 02	2.882E-03	3.889E-02
5.484E 01	7.295E 00	3.035E 02	2.871E-03	3.575E-02
5.576E 01	6.507E 00	3.120E 02	2.845E-03	3.361E-02
5.627E 01	2.881E 00	3.149E 02	2.826E-03	3.062E-02
5.632E 01	4.209E-01	3.153E 02	2.809E-03	2.872E-02
5.646E 01	1.100E 00	3.164E 02	2.810E-03	2.890E-02
5.654E 01	6.417E-01	3.170E 02	3.259E-03	2.826E-02
5.662E 01	2.240E 00	3.192E 02	2.981E-03	2.806E-02
5.705E 01	1.744E 00	3.210E 02	2.943E-03	2.592E-02
5.777E 01	5.646E 00	3.264E 02	2.919E-03	2.592E-02
5.879E 01	8.440E 00	3.351E 02	2.884E-03	1.862E-02
6.080E 01	1.485E 01	3.499E 02	2.873E-03	3.735E-02
6.222E 01	1.003E 01	3.600E 02	3.113E-03	2.974E-02
6.469E 01	1.785E 01	3.778E 02	3.144E-03	3.232E-02
6.506E 01	2.352E 00	3.802E 02	3.311E-03	2.963E-02
6.510E 01	2.435E-01	3.804E 02	3.138E-03	3.016E-02
6.530E 01	1.236E 00	3.816E 02	3.389E-03	3.008E-02
6.696E 01	1.081E 01	3.928E 02	3.246E-03	2.233E-02
6.763E 01	4.132E 00	3.966E 02	3.217E-03	2.012E-02
6.840E 01	4.366E 00	4.009E 02	3.155E-03	1.554E-02
6.912E 01	3.517E 01	4.045E 02	3.110E-03	1.267E-02
6.973E 01	2.621E 00	4.071E 02	3.080E-03	1.089E-02
7.068E 01	3.498E 00	4.108E 02	3.030E-03	8.425E-03
7.111E 01	1.393E 01	4.120E 02	3.014E-03	7.728E-03
7.264E 01	4.360E 00	4.163E 02	2.969E-03	6.098E-03
7.279E 01	3.600E-01	4.167E 02	2.956E-03	5.890E-03
7.354E 01	1.482E 00	4.182E 02	2.883E-03	3.890E-03
7.355E 01	2.401E-03	4.182E 02	2.883E-03	3.880E-03
7.487E 01	8.618E-01	4.190E 02	2.924E-03	5.062E-03
7.772E 01	2.171E 00	4.212E 02	2.986E-03	7.720E-03
8.162E 01	2.433E 00	4.236E 02	2.915E-03	5.605E-03
8.443E 01	1.039E 00	4.247E 02	2.868E-03	4.772E-03
8.729E 01	4.492E-01	4.251E 02	2.907E-03	6.356E-03
8.730E 01	0.000	4.251E 02	2.907E-03	6.359E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

RAMJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... 1365. (LBF)  
 MEASURED THRUST..... 1503. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1769. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 1948. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5474  
 MEASURED THRUST COEFFICIENT..... 0.6027

REGENERATIVE=COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 6495. (LBF)  
 NET THRUST..... 1479. (LBF)  
 SPECIFIC IMPULSE..... 1917. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.5930

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 113.3 (LBF)  
 INLET MOMENTUM CHANGE..... -756.0 (LBF)  
 COMBUSTOR FRICTION DRAG..... 266.9 (LBF)  
 COMBUSTOR STRUT DRAG..... -15.94 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 889. (LBF)  
 NOZZLE FRICTION DRAG..... 44.98 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1233. (LBF)  
 EXTERNAL FRICTION DRAG..... 45.56 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1041. (LBF)  
 TOTAL EXTERNAL DRAG..... -1087. (LBF)  
 TOTAL STRUT DRAG..... -15.94 (LBF)  
 CAVITY FORCE..... -1139. (LBF)  
 CALCULATED LOAD CELL FORCE..... -860. (LBF)  
 MEASURED LOAD CELL FORCE..... -722. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0. -156.2. -121.5.

STATIONS

NOMINAL CONE LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3248 (IN)  
 INLET THROAT..... 40.200 (IN)  
 CONE LEADING EDGE..... 35.204 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.549 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.301 (IN)  
 STRUT LEADING EDGE..... 56.465 (IN)  
 STRUT TRAILING EDGE..... 65.065 (IN)  
 COMBUSTOR EXIT..... 65.065 (IN)

INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9854  
 ADDITIVE DRAG COEFFICIENT..... 0.0005  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1609  
 OPLTA P12..... 0.1166 (P81)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3749  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1632  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8920  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9046  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9357  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8875  
 ENTHALPY AT P0 = SUPERSONIC..... -21.73 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 29.82 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO..... 0.0288  
 EQUIVALENCE RATIO..... 0.866  
 COMBUSTOR EFFICIENCY..... 0.749  
 TOTAL PRESSURE RATIO..... 0.1434  
 COMBUSTOR EFFECTIVENESS..... 0.7239  
 INJECTOR DISCHARGE COEFFICIENTS 0.8300, 0.7065, 0.7683, 0.7028

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9514  
 NOZZLE COEFFICIENT = C1..... 0.8726  
 PROCESS EFFICIENCY..... 0.8929  
 KINETIC ENERGY EFFICIENCY..... 0.8911

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.310	B
1C	44.300	
2A	48.785	D
2C	46.250	E
3A	54.075	
3B	56.260	
4	44.810	

Reading 60

$t = 202.49 \text{ sec,}$

SUMMARY REPORT

	P	T	H	GAMPA	MOLWT	SONV	MACH	VEL	S	W/A	N	A/AC	MUMIN	K	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000 747.249 2990	666.4( 791)	1.2930	28.966	2376													
0.000 0.368 405	31.7( 97)	1.3989	28.965	986	5.993	5910	1.826	0.10620	26.761	0.9838			5014	9.755	187.4		
SPIKE TIP N8	2	0	4														
0.600 18.100 2990	666.4( 791)	1.2929	28.965	2376													
0.600 16.364 2922	640.0( 772)	1.2951	28.965	2349	0.397	1012	2.081	0.10620	26.761	0.9838			4965	1.670	185.5		
WIND TUNNEL	3	0	0														
0.000 747.249 2990	666.4( 791)	1.2930	28.966	2376													
0.000 0.362 403	32.1( 97)	1.3988	28.965	984	6.010	5912	1.826	0.10493	26.441	0.9838			4955	9.641	187.4		
SPIKE TIP N8	4	0	0														
0.600 18.100 2990	666.4( 791)	1.2929	28.965	2376													
0.600 16.411 2924	640.6( 772)	1.2950	28.965	2350	0.391	997	2.081	0.10493	26.441	0.9838			4955	1.627	187.4		
INLET THROAT	5	0	3														
40.400 280.143 2939	651.0( 776)	1.2946	28.966	2356	2.481	4573	1.888	0.94260	26.761	0.1108			4261	66.982	159.2		
40.400 16.125 1866	233.2( 362)	1.3408	28.965	1843													
INLET UPN8K	6	0	3														
40.400 280.143 2939	651.0( 776)	1.2946	28.966	2356													
40.400 13.882 1409	216.1( 347)	1.3531	28.965	1809	2.573	4634	1.888	0.85691	26.761	0.1219			4304	61.980	160.8		
INLET DN8K	7	0	4														
40.400 122.355 2939	651.0( 776)	1.2946	28.966	2356													
40.400 104.859 2837	620.4( 787)	1.2979	28.966	2314	0.492	1837	1.945	0.85691	26.761	0.1219			4304	16.472	160.8		
COMBUSTOR	8	1	21														
40.410 240.773 2901	652.7( 797)	1.2969	27.774	2595													
40.410 14.333 1434	226.6( 374)	1.3517	27.773	1876	2.461	4617	1.964	0.94365	26.851	0.1109			4260	67.846	158.6	0.10	0.07
COMBUSTOR	9	2	21														
41.328 171.205 2832	656.0( 810)	1.3009	26.516	2628													
41.328 22.257 1725	333.3( 470)	1.3308	26.515	2082	1.989	4141	2.034	0.95065	26.932	0.1107			4100	61.183	152.1	0.21	0.04
COMBUSTOR	10	3	21														
41.332 177.833 2787	656.0( 797)	1.3029	26.469	2612													
41.332 22.334 1680	314.1( 457)	1.3623	26.469	2058	2.010	4136	2.047	0.98094	26.932	0.1107			4098	61.129	152.1	0.21	0.01
COMBUSTOR	11	4	2														
41.337 175.616 2780	655.7( 795)	1.3033	26.462	2609													
41.337 22.898 1691	319.3( 460)	1.3416	26.462	2065	1.987	4102	2.047	0.95138	26.932	0.1106			4088	60.655	151.6	0.21	0.00
COMBUSTOR	12	5	3														
41.500 166.316 2808	655.1( 803)	1.3019	26.494	2619													
41.500 24.218 1759	329.9( 480)	1.3365	26.494	2102	1.919	4034	2.034	0.95220	26.952	0.1105			4065	59.696	150.8	0.21	0.03
COMBUSTOR	13	6	21														
42.460 141.523 2763	659.2( 789)	1.3038	26.466	2601													
42.460 25.929 1831	359.8( 502)	1.3359	26.465	2143	1.775	3805	2.061	0.94230	26.932	0.1117			3929	55.718	145.8	0.21	0.00
COMBUSTOR	14	7	4														
44.117 108.171 2995	636.2( 859)	1.2925	26.755	2682													
44.117 38.999 2362	434.0( 660)	1.3136	26.756	2401	1.325	3181	2.100	0.90928	26.952	0.1157			3820	44.945	141.7	0.21	0.24
COMBUSTOR	15	8	2														
44.310 106.682 3001	634.5( 861)	1.2921	26.768	2684													
44.310 40.101 2391	439.3( 669)	1.3124	26.769	2414	1.294	3125	2.102	0.90773	26.932	0.1159			3809	44.085	141.3	0.21	0.25
COMBUSTOR	16	9	3														
44.800 103.491 3009	629.9( 863)	1.2915	26.791	2685													
44.800 42.897 2454	452.0( 688)	1.3100	26.792	2443	1.222	2984	2.104	0.90423	26.952	0.1164			3778	41.930	140.2	0.21	0.27
COMBUSTOR	17	10	2														
44.832 103.373 3007	629.6( 862)	1.2916	26.791	2685													
44.832 42.974 2455	452.3( 688)	1.3100	26.792	2443	1.219	2979	2.104	0.90406	26.932	0.1164			3776	41.850	140.1	0.21	0.27
COMBUSTOR	18	11	13														
46.250 94.289 2619	634.9( 830)	1.3114	23.618	2689													
46.250 46.390 2206	491.2( 687)	1.3254	23.618	2481	1.081	2681	2.270	0.86162	27.233	0.1234			3736	35.902	137.2	0.53	0.04

READING = 0040 BLOCK = 107 TIME = 202.493 MACH = 6.0 PI = 147.249 IT = 2490.0

COMBUSTOR	P	T	M	GAMMA	MOL%T	SONV	MACH	VEL	S	N/A	A/C	MURIM	G	IVAL	PHI	ETAC
46.224	0 19	12	2	1.3113	23.620	2689										
46.260	0 20	13	4	1.3253	23.620	2482	1.080	2680	2.270	0.86091	27.233	0.1235	3737	35.655	137.2	0.53 0.04
47.310	0 21	14	2	1.3039	23.792	2749										
47.357	0 22	15	4	1.3163	23.792	2572	0.994	2556	2.289	0.80108	27.233	0.1327	3827	31.819	140.5	0.53 0.12
48.110	0 23	16	8	1.3036	23.799	2752										
48.157	0 24	17	2	1.3159	23.799	2576	0.987	2543	2.290	0.79894	27.233	0.1331	3831	31.575	140.7	0.53 0.12
48.797	0 25	18	4	1.2964	23.961	2807										
48.807	0 26	19	5	1.3083	23.961	2644	0.950	2513	2.306	0.74630	27.233	0.1425	3927	29.148	144.2	0.53 0.18
49.337	0 27	20	4	1.3101	21.392	2853										
49.337	0 28	21	4	1.3250	21.392	2626	1.102	2893	2.482	0.69255	27.530	0.1552	4015	31.140	145.8	0.86 0.10
50.747	0 29	22	4	1.3100	21.394	2854										
50.747	0 30	23	3	1.3250	21.395	2627	1.103	2897	2.483	0.69165	27.530	0.1554	4017	31.136	145.9	0.86 0.10
52.847	0 31	24	4	1.3008	21.497	2900										
52.847	0 32	25	5	1.3215	21.497	2650	1.163	3082	2.497	0.60686	27.530	0.1662	4112	30.981	149.4	0.86 0.13
53.347	0 33	26	5	1.2886	21.812	3029										
53.347	0 34	27	3	1.3070	21.813	2775	1.179	3270	2.538	0.55130	27.530	0.1950	4340	28.019	157.6	0.86 0.23
54.097	0 35	28	4	1.2764	22.056	3109										
54.097	0 36	29	4	1.3022	22.060	2774	1.388	3850	2.562	0.45185	27.530	0.2379	4608	27.036	167.4	0.86 0.30
54.857	0 37	30	3	1.2736	22.111	3126										
54.857	0 38	31	4	1.3006	22.115	2782	1.412	3929	2.568	0.43339	27.530	0.2480	4650	26.463	169.2	0.86 0.32
56.282	0 39	32	4	1.2711	22.162	3140										
56.282	0 40	33	3	1.3002	22.167	2774	1.467	4069	2.573	0.40853	27.530	0.2631	4726	25.833	171.7	0.86 0.33
56.477	0 41	34	3	1.2703	22.183	3143										
56.477	0 42	35	4	1.3017	22.189	2747	1.536	4220	2.574	0.38632	27.530	0.2782	4786	25.334	173.9	0.86 0.34
56.760	0 43	36	5	1.2687	22.252	3162										
56.760	0 44	37	5	1.2948	22.259	2750	1.567	4316	2.581	0.36325	27.530	0.2959	4850	24.365	176.2	0.86 0.36
56.837	0 45	38	5	1.2401	22.676	3281										
56.837	0 46	39	5	1.2755	22.704	2950	1.443	4257	2.627	0.29222	27.530	0.3678	5014	19.331	182.1	0.86 0.49
56.337	0 47	40	5	1.2618	22.337	3186										
56.337	0 48	41	3	1.3006	22.347	2719	1.705	4638	2.595	0.29135	27.530	0.3689	5017	20.998	182.2	0.86 0.38
56.477	0 49	42	3	1.2613	22.346	3189										
56.477	0 50	43	6	1.3003	22.356	2721	1.709	4649	2.596	0.28920	27.530	0.3717	5026	20.893	182.5	0.86 0.39
56.557	0 51	44	6	1.2009	22.667	3278										
56.557	0 52	45	3	1.2772	22.694	2934	1.072	4319	2.625	0.29249	27.530	0.3675	5031	19.634	182.7	0.86 0.48
56.837	0 53	46	3	1.2316	22.680	3275										
56.837	0 54	47	3	1.2786	22.687	2919	1.499	4376	2.623	0.29163	27.530	0.3686	5047	19.834	183.3	0.86 0.48
57.063	0 55	48	3	1.2442	22.624	3265										
57.063	0 56	49	3	1.2620	22.648	2888	1.541	4451	2.619	0.29103	27.530	0.3693	5059	20.129	183.8	0.86 0.47

ORIGINAL PAGE IS  
OF POOR QUALITY

READING 0060 BLOCK 8 107 TIME 202.493 MACH 6.0 P1 = 747.249 T1 = 2990.0

	P	T	M	GAMMA	MOL-T	SONV	MACH	VEL	S	W/A	K	A/C	MURTH	G	IVAL	PHI	ETAC
COMBUSTOR	0	30	31														
57.787	52.941	1757	573.9(1343)	1.2533	22.498	3226											
57.787	11.375	2700	138.4( 925)	1.2934	22.503	2778	1.681	4668	2.605	0.28641	27.530	0.3753	5068	20.774	184.8	0.86	0.43
COMBUSTOR	0	39	32														
58.807	94.618	3023	570.7(1065)	1.2922	21.811	2984											
58.807	5.850	1938	9.3( 507)	1.3485	21.812	2174	2.438	5300	2.498	0.28459	27.530	0.3777	5101	23.441	185.3	0.86	0.23
COMBUSTOR	0	40	33														
60.817	45.877	4285	565.0(1546)	1.2161	23.051	3353											
60.817	17.375	3576	236.7(1257)	1.2501	23.114	3131	1.307	4053	2.643	0.29449	27.530	0.3650	5042	18.548	185.0	0.86	0.60
COMBUSTOR	0	41	34														
62.837	47.939	4195	560.7(1511)	1.2231	22.966	3333											
62.837	16.700	3626	213.9(1199)	1.2386	23.017	3052	1.365	4166	2.635	0.30240	27.530	0.3553	5084	19.581	184.7	0.86	0.58
COMBUSTOR	0	42	35														
64.701	42.736	4459	552.3(1613)	1.2011	23.268	3383											
64.701	20.760	3947	297.1(1402)	1.2269	23.351	3211	1.113	3574	2.655	0.28671	27.530	0.3749	5070	15.923	184.2	0.86	0.67
COMBUSTOR	0	43	36														
65.077	39.504	4493	550.9(1626)	1.1972	23.309	3387											
65.077	21.192	4051	324.5(1443)	1.2196	23.393	3240	1.039	3365	2.662	0.28655	27.530	0.4032	5068	13.941	184.1	0.86	0.69
COMBUSTOR	0	44	37														
65.077	39.504	4493	550.9(1604)	1.1972	23.309	3387											
65.077	21.481	4190	395.3(1500)	1.2102	23.367	3285	1.030	3382	2.679	0.28655	27.530	0.4032	5113	14.010	185.7	0.86	0.69
NOZZLE	0	45	38														
87.313	39.504	4493	550.9(1604)	1.1972	23.309	3387											
87.313	1.148	2307	-635.6( 723)	1.2998	23.455	2466	2.849	7026	2.662	0.05549	27.530	1.9371	6581	6.058	239.1	0.86	0.69
NOZZLE	0	46	39														
87.313	39.504	4493	550.9(1604)	1.1972	23.309	3387											
87.313	0.268	1707	-614.6( 544)	1.3215	23.455	2187	3.492	7637	2.662	0.02837	27.530	4.0763	6940	3.129	252.1	0.86	0.69
NOZZLE	0	47	40														
87.313	39.504	4493	550.9(1678)	1.1892	23.263	3425											
87.313	1.192	2324	-392.2( 766)	1.2950	23.455	2526	2.823	7130	2.679	0.05549	27.530	1.9371	6693	6.149	243.1	0.86	0.69
NOZZLE	0	48	41														
87.313	39.504	4493	550.9(1678)	1.1892	23.263	3425											
87.313	0.268	1787	-586.6( 572)	1.3176	23.455	2234	3.483	7783	2.679	0.02567	27.530	4.1873	7076	3.105	257.0	0.86	0.69
FICTIVE	0	49	42														
65.077	280.143	5316	550.9(1949)	1.1688	24.219	3568											
65.077	0.268	1977	-1149.0( 451)	1.3217	24.698	1983	4.652	9223	2.512	0.03875	27.530	2.7736	8168	5.554	296.7	0.86	1.00
FICTIVE	0	50	43														
87.313	25.882	4938	529.6(1604)	1.1950	23.303	3364											
87.313	1.409	2514	-321.0( 837)	1.2879	23.454	2620	2.490	6524	2.694	0.05549	27.530	1.9371	6281	5.626	228.2	0.86	0.69

READING = 0060 BLOCK = 107 TIME = 202.493 MACH 6.0 P1 = 747.209 T1 = 2940.0

XAS	P=1B	P=OB	PDA	GUX	G=OB	C=ALL	P=1B/P80	P=1R/P10	P=OB/P80	P=OB/P10
6.981E+01	1.070E 00	0.000	-4.410E+01	0.000	0.000	2.470E+02	2.755E 00	1.432E+03	0.000	0.000
1.83E 01	1.070E 00	0.000	-3.562E 01	0.000	0.000	1.635E 02	2.755E 00	1.432E+03	0.000	0.000
3.070E 01	2.205E 00	0.000	-1.684E 02	0.000	0.000	5.053E 02	5.678E 00	5.231E+03	0.000	0.000
3.908E 01	3.909E 00	0.000	-3.665E 02	0.000	0.000	6.804E 02	1.006E 01	5.231E+03	0.000	0.000
3.521E 01	3.966E 00	5.765E 00	-4.343E 02	0.000	0.000	6.864E 02	1.014E 01	5.268E+03	1.484E 01	7.715E+03
3.528E 01	3.938E 00	5.728E 00	-4.344E 02	0.000	0.000	6.866E 02	1.014E 01	5.268E+03	1.484E 01	7.765E+03
3.552E 01	4.005E 00	3.700E 00	-4.417E 02	0.000	0.000	7.194E 02	1.031E 01	5.360E+03	9.526E 00	4.951E+03
3.568E 01	3.910E 00	1.625E 00	-4.584E 02	0.000	0.000	7.539E 02	1.007E 01	5.233E+03	6.184E 00	2.175E+03
3.606E 01	3.910E 00	2.338E 00	-4.684E 02	0.000	0.000	7.719E 02	1.007E 01	5.233E+03	6.021E 00	3.129E+03
3.648E 01	4.204E 00	4.066E 00	-4.895E 02	0.000	0.000	8.153E 02	1.033E 01	5.626E+03	1.047E 01	5.444E+03
3.701E 01	4.103E 00	6.251E 00	-5.149E 02	0.000	0.000	8.713E 02	1.036E 01	5.607E+03	1.609E 01	8.365E+03
3.733E 01	4.103E 00	7.637E 00	-5.278E 02	0.000	0.000	9.074E 02	1.036E 01	5.607E+03	1.607E 01	1.022E+02
3.807E 01	1.286E 01	1.286E 01	-5.431E 02	0.000	0.000	9.821E 02	1.011E 01	5.233E+03	3.312E 01	1.721E+02
3.837E 01	1.544E 00	1.544E 00	-5.622E 02	0.000	0.000	1.020E 03	1.402E 01	7.288E+03	3.975E 01	2.066E+02
3.875E 01	1.518E 00	1.518E 00	-5.428E 02	0.000	0.000	1.063E 03	1.408E 01	9.603E+03	3.909E 01	2.032E+02
3.884E 01	1.512E 00	1.512E 00	-5.429E 02	0.000	0.000	1.075E 03	1.408E 01	1.013E+02	3.895E 01	2.024E+02
3.901E 01	1.542E 01	1.542E 01	-5.622E 02	0.000	0.000	1.093E 03	2.150E 01	1.131E+02	3.970E 01	2.063E+02
3.932E 01	1.509E 01	1.509E 01	-5.483E 02	0.000	0.000	1.131E 03	2.150E 01	1.131E+02	4.117E 01	2.140E+02
3.952E 01	1.258E 01	1.258E 01	-5.551E 02	0.000	0.000	1.149E 03	4.333E 01	2.247E+02	3.240E 01	1.684E+02
3.980E 01	1.741E 01	1.741E 01	-5.805E 02	0.000	0.000	1.180E 03	4.333E 01	2.247E+02	1.313E 01	6.825E+03
4.000E 01	1.801E 01	4.797E 01	-5.964E 02	0.000	0.000	1.207E 03	4.637E 01	2.410E+02	1.225E 01	6.366E+03
4.031E 01	2.335E 01	4.050E 00	-6.339E 02	0.000	0.000	1.247E 03	6.011E 01	3.124E+02	1.043E 01	5.420E+03
4.040E 01	2.455E 01	4.146E 00	-6.418E 02	0.000	0.000	1.259E 03	6.269E 01	3.358E+02	1.068E 01	5.548E+03
4.041E 01	2.455E 01	4.146E 00	-6.418E 02	0.000	0.000	1.259E 03	6.269E 01	3.358E+02	1.068E 01	5.548E+03
4.132E 01	3.895E 01	5.532E 01	-7.847E 02	0.000	0.000	1.363E 03	1.003E 02	5.131E+02	1.427E 01	7.417E+03
4.133E 01	3.911E 01	5.558E 01	-7.864E 02	0.000	0.000	1.363E 03	1.003E 02	5.131E+02	1.431E 01	7.439E+03
4.140E 01	4.014E 01	3.656E 01	-7.980E 02	0.000	0.000	1.372E 03	1.034E 02	5.372E+02	1.456E 01	7.569E+03
4.150E 01	4.117E 01	6.661E 00	-8.166E 02	0.000	0.000	1.382E 03	1.076E 02	5.591E+02	1.715E 01	8.915E+03
4.242E 01	3.585E 01	3.214E 01	-9.358E 02	0.000	0.000	1.402E 03	9.231E 01	6.137E+02	6.122E 01	2.142E+02
4.412E 01	4.586E 01	4.703E 01	-1.018E 03	0.000	0.000	1.499E 03	1.131E 02	6.137E+02	6.275E 01	4.301E+02
4.43E 01	4.703E 01	3.318E 01	-1.027E 03	0.000	0.000	1.499E 03	1.131E 02	6.137E+02	6.275E 01	4.301E+02
4.480E 01	4.997E 01	3.501E 01	-1.051E 03	0.000	0.000	1.535E 02	1.211E 02	6.293E+02	8.542E 01	4.440E+02
4.482E 01	4.997E 01	3.501E 01	-1.051E 03	0.000	0.000	1.535E 02	1.211E 02	6.293E+02	8.542E 01	4.440E+02
4.622E 01	4.919E 01	4.359E 01	-1.027E 03	0.000	0.000	1.645E 02	1.266E 02	6.822E+02	1.123E 02	5.834E+02
4.626E 01	4.919E 01	4.359E 01	-1.027E 03	0.000	0.000	1.645E 02	1.266E 02	6.822E+02	1.123E 02	5.834E+02
4.731E 01	4.860E 01	4.929E 01	-9.230E 02	0.000	0.000	2.093E 03	1.231E 02	6.504E+02	1.266E 02	6.596E+02
4.736E 01	4.860E 01	4.929E 01	-9.230E 02	0.000	0.000	2.093E 03	1.231E 02	6.504E+02	1.266E 02	6.596E+02
4.811E 01	5.479E 01	4.368E 01	-8.141E 02	0.000	0.000	2.093E 03	1.231E 02	6.504E+02	1.266E 02	6.596E+02
4.880E 01	3.872E 01	3.872E 01	-6.029E 02	0.000	0.000	2.270E 03	1.411E 02	7.532E+02	1.130E 02	5.872E+02
4.881E 01	3.884E 01	3.884E 01	-6.009E 02	0.000	0.000	2.280E 03	1.411E 02	7.532E+02	1.130E 02	5.872E+02
4.934E 01	3.466E 01	3.466E 01	-5.797E 02	0.000	0.000	2.346E 03	8.948E 01	4.638E+02	8.924E 01	4.638E+02
5.075E 01	3.087E 01	3.087E 01	-3.374E 02	0.000	0.000	2.526E 03	7.948E 01	4.131E+02	7.948E 01	4.131E+02
5.285E 01	2.156E 01	2.156E 01	-4.879E 01	0.000	0.000	2.790E 03	5.532E 01	2.866E+02	5.532E 01	2.866E+02
5.335E 01	2.040E 01	2.040E 01	-5.749E 00	0.000	0.000	2.790E 03	5.532E 01	2.866E+02	5.532E 01	2.866E+02
5.410E 01	1.846E 01	1.846E 01	0.094E 01	0.000	0.000	2.954E 03	5.253E 01	2.730E+02	5.253E 01	2.730E+02
5.466E 01	1.650E 01	1.650E 01	1.487E 02	0.000	0.000	2.954E 03	4.754E 01	2.471E+02	4.754E 01	2.471E+02
5.576E 01	1.527E 01	1.527E 01	2.207E 02	0.000	0.000	3.047E 03	4.249E 01	2.008E+02	4.249E 01	2.008E+02
5.626E 01	1.455E 01	1.455E 01	3.669E 02	0.000	0.000	3.163E 03	3.931E 01	2.043E+02	3.931E 01	2.043E+02
5.634E 01	7.725E 00	1.448E 01	3.910E 02	0.000	0.000	3.209E 03	3.768E 01	1.948E+02	3.768E 01	1.948E+02
5.648E 01	7.725E 00	1.448E 01	3.910E 02	0.000	0.000	3.209E 03	3.768E 01	1.948E+02	3.768E 01	1.948E+02
5.656E 01	1.418E 01	1.418E 01	4.004E 02	0.000	0.000	3.246E 03	1.999E 01	1.034E+02	1.999E 01	1.034E+02
5.684E 01	1.368E 01	1.368E 01	4.061E 02	0.000	0.000	3.246E 03	1.999E 01	1.034E+02	1.999E 01	1.034E+02
5.706E 01	1.322E 01	1.322E 01	4.244E 02	0.000	0.000	3.280E 03	3.652E 01	1.898E+02	3.652E 01	1.898E+02
5.779E 01	1.137E 01	1.137E 01	4.375E 02	0.000	0.000	3.305E 03	3.405E 01	1.847E+02	3.405E 01	1.847E+02
5.881E 01	5.850E 00	5.850E 00	4.709E 02	0.000	0.000	3.402E 03	2.929E 01	1.522E+02	2.929E 01	1.522E+02
6.082E 01	1.737E 01	1.737E 01	4.935E 02	0.000	0.000	3.532E 03	1.506E 01	7.629E+03	1.506E 01	7.629E+03
						3.790E 03	4.474E 01	2.325E+02	4.474E 01	2.325E+02



XAS	P-IB	P-OB	PDA	WAX	W-IB	Q-OB	CWALL	P-IB/P80	P-IB/P10	P-OB/P80	P-OB/P10
6.220E 01	1.670E 01	1.670E 01	4.935E 02	-4.080E 03	-1.756E 03	-2.329E 03	3.972E 03	4.300E 01	2.235E-02	4.300E 01	2.235E-02
6.470E 01	2.090E 01	2.090E 01	4.935E 02	-4.716E 03	-1.821E 03	-2.495E 03	4.249E 03	5.397E 01	2.805E-02	5.397E 01	2.805E-02
6.508E 01	2.077E 01	2.077E 01	4.935E 02	-4.350E 03	-1.833E 03	-2.523E 03	4.337E 03	5.349E 01	2.780E-02	5.349E 01	2.780E-02
6.512E 01	2.077E 01	2.077E 01	4.935E 02	-4.360E 03	-1.834E 03	-2.526E 03	4.342E 03	5.349E 01	2.780E-02	5.349E 01	2.780E-02
6.532E 01	1.970E 01	2.202E 01	4.935E 02	-4.291E 03	-1.840E 03	-2.541E 03	4.368E 03	5.088E 01	2.645E-02	5.088E 01	2.645E-02
6.698E 01	1.135E 01	9.150E 00	6.699E 02	-4.525E 03	-1.883E 03	-2.642E 03	4.583E 03	2.923E 01	1.519E-02	2.923E 01	1.519E-02
6.765E 01	8.165E 00	9.210E 00	8.585E 02	-4.571E 03	-1.896E 03	-2.675E 03	4.665E 03	2.102E 01	1.092E-02	2.102E 01	1.092E-02
6.842E 01	4.500E 00	7.083E 00	1.056E 03	-4.620E 03	-1.908E 03	-2.712E 03	4.760E 03	1.159E 01	6.025E-03	1.159E 01	6.025E-03
6.914E 01	3.523E 00	5.083E 00	1.184E 03	-4.664E 03	-1.917E 03	-2.747E 03	4.848E 03	9.071E 00	4.715E-03	1.302E 01	6.785E-03
6.975E 01	2.693E 00	4.183E 00	1.287E 03	-4.700E 03	-1.923E 03	-2.777E 03	4.922E 03	6.939E 00	3.607E-03	1.077E 01	5.598E-03
7.070E 01	2.013E 00	2.825E 00	1.358E 03	-4.752E 03	-1.930E 03	-2.822E 03	5.036E 03	5.185E 00	2.695E-03	7.275E 00	3.781E-03
7.113E 01	1.703E 00	2.629E 00	1.330E 03	-4.772E 03	-1.933E 03	-2.840E 03	5.088E 03	4.390E 00	2.282E-03	6.769E 00	3.518E-03
7.266E 01	1.072E 00	1.930E 00	1.475E 03	-4.849E 03	-1.940E 03	-2.889E 03	5.273E 03	2.760E 00	1.435E-03	4.970E 00	2.583E-03
7.281E 01	1.010E 00	1.703E 00	1.481E 03	-4.844E 03	-1.940E 03	-2.893E 03	5.290E 03	2.601E 00	1.352E-03	4.386E 00	2.279E-03
7.356E 01	1.051E 00	5.700E-01	1.519E 03	-4.888E 03	-1.943E 03	-2.915E 03	5.374E 03	2.712E 00	1.410E-03	1.468E 00	7.628E-04
7.356E 01	1.051E 00	5.639E-01	1.520E 03	-4.899E 03	-1.943E 03	-2.915E 03	5.375E 03	2.712E 00	1.410E-03	1.468E 00	7.628E-04
7.489E 01	1.130E 00	0.000	1.543E 03	-4.908E 03	-1.948E 03	-2.960E 03	5.426E 03	2.910E 00	1.512E-03	0.000	0.000
7.774E 01	2.185E 00	0.000	1.609E 03	-4.916E 03	-1.956E 03	-2.960E 03	5.525E 03	5.626E 00	2.924E-03	0.000	0.000
8.164E 01	1.475E 00	0.000	1.687E 03	-4.924E 03	-1.963E 03	-2.960E 03	5.630E 03	3.798E 00	1.974E-03	0.000	0.000
8.445E 01	1.125E 00	0.000	1.716E 03	-4.930E 03	-1.970E 03	-2.960E 03	5.684E 03	2.897E 00	1.506E-03	0.000	0.000
8.731E 01	1.693E 00	0.000	1.750E 03	-4.941E 03	-1.981E 03	-2.960E 03	5.707E 03	4.364E 00	2.268E-03	0.000	0.000
8.731E 01	1.693E 00	0.000	1.750E 03	-4.941E 03	-1.981E 03	-2.960E 03	5.707E 03	4.364E 00	2.268E-03	0.000	0.000

READING = 0060 CLOCK = 107 TIME = 202.493 MACH 9.0 PI = 747.249 TI = 2990.0

X	DDAG	CDRAG	CF	HC
4.040E 01	1.140E 02	1.140E 02	2.224E 03	4.345E 02
4.041E 01	1.877E 01	1.142E 02	2.224E 03	5.911E 02
4.132E 01	1.802E 01	1.322E 02	2.690E 03	5.141E 02
4.133E 01	1.890E 01	1.324E 02	2.486E 03	5.485E 02
4.140E 01	1.167E 00	1.336E 02	2.486E 03	5.609E 02
4.150E 01	1.831E 00	1.354E 02	2.582E 03	5.787E 02
4.246E 01	1.677E 01	1.522E 02	2.582E 03	5.727E 02
4.412E 01	2.653E 01	1.781E 02	3.036E 03	6.753E 02
4.431E 01	2.876E 00	1.816E 02	2.829E 03	6.483E 02
4.480E 01	7.301E 00	1.889E 02	3.036E 03	6.550E 02
4.483E 01	4.659E 00	1.898E 02	2.868E 03	6.524E 02
4.625E 01	2.064E 01	2.100E 02	3.234E 03	5.946E 02
4.626E 01	1.351E 01	2.101E 02	3.036E 03	6.912E 02
4.731E 01	1.239E 01	2.225E 02	2.868E 03	6.923E 02
4.736E 01	5.228E 01	2.230E 02	2.900E 03	6.719E 02
4.811E 01	2.248E 00	2.312E 02	2.867E 03	6.815E 02
4.880E 01	7.878E 00	2.392E 02	3.196E 03	5.978E 02
4.881E 01	1.178E 01	2.393E 02	2.867E 03	6.329E 02
4.931E 01	3.815E 00	2.451E 02	2.790E 03	6.012E 02
5.075E 01	1.453E 01	2.596E 02	2.757E 03	5.586E 02
5.285E 01	2.027E 01	2.799E 02	2.775E 03	4.420E 02
5.335E 01	4.820E 00	2.847E 02	2.867E 03	4.090E 02
5.410E 01	7.204E 00	2.919E 02	3.036E 03	3.868E 02
5.486E 01	7.134E 00	2.991E 02	2.867E 03	3.551E 02
5.574E 01	8.212E 00	3.073E 02	3.036E 03	3.365E 02
5.628E 01	2.870E 00	3.101E 02	2.867E 03	3.045E 02
5.634E 01	4.119E 01	3.106E 02	2.980E 03	2.863E 02
5.648E 01	1.077E 00	3.114E 02	2.867E 03	2.579E 02
5.656E 01	6.259E 01	3.123E 02	3.036E 03	2.865E 02
5.684E 01	2.184E 00	3.144E 02	2.975E 03	2.797E 02
5.704E 01	1.709E 00	3.161E 02	3.036E 03	2.741E 02
5.779E 01	5.555E 00	3.211E 02	2.900E 03	2.523E 02
5.881E 01	8.260E 00	3.300E 02	2.810E 03	1.672E 02
6.082E 01	1.455E 01	3.445E 02	3.036E 03	3.661E 02
6.224E 01	9.822E 00	3.543E 02	3.036E 03	2.982E 02
6.470E 01	1.747E 01	3.718E 02	3.233E 03	3.180E 02
6.508E 01	2.314E 00	3.744E 02	3.036E 03	2.944E 02
6.512E 01	2.383E 00	3.744E 02	3.036E 03	2.944E 02
6.532E 01	1.211E 00	3.750E 02	3.368E 03	2.980E 02
6.698E 01	1.059E 01	3.862E 02	3.218E 03	2.211E 02
6.765E 01	4.055E 00	3.908E 02	3.190E 03	2.004E 02
6.842E 01	4.299E 00	3.945E 02	3.121E 03	1.555E 02
6.914E 01	3.471E 00	3.980E 02	3.036E 03	1.211E 02
6.975E 01	2.587E 00	4.006E 02	3.047E 03	1.009E 02
7.070E 01	3.452E 00	4.040E 02	2.996E 03	8.444E 03
7.113E 01	1.379E 00	4.054E 02	2.988E 03	7.786E 03
7.266E 01	4.265E 00	4.097E 02	2.925E 03	5.910E 03
7.281E 01	3.452E 01	4.100E 02	2.910E 03	5.473E 03
7.356E 01	1.408E 00	4.114E 02	2.838E 03	3.684E 03
7.356E 01	2.261E 03	4.114E 02	2.838E 03	3.684E 03
7.489E 01	6.063E 01	4.122E 02	2.838E 03	4.742E 03
7.774E 01	2.094E 00	4.143E 02	2.953E 03	7.747E 03
8.164E 01	2.393E 00	4.167E 02	2.878E 03	5.735E 03
8.445E 01	1.010E 00	4.177E 02	2.835E 03	4.643E 03
8.731E 01	4.374E 01	4.182E 02	2.872E 03	6.306E 03
8.731E 01	0.000	4.182E 02	2.872E 03	6.311E 03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST.....	1264. (LBF)	ANGLE OF ATTACK .....	0.000 (DEGREES)
MEASURED THRUST.....	1502. (LBF)	MASS FLOW RATIO.....	0.9838
CALCULATED SPECIFIC IMPULSE.....	1644. (LBF-SEC/LBM)	ADDITIONAL DRAG COEFFICIENT.....	0.0006
MEASURED SPECIFIC IMPULSE.....	1933. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1614
CALCULATED THRUST COEFFICIENT.....	0.5060	DELTA PT2.....	0.1191 (PSI)
MEASURED THRUST COEFFICIENT.....	0.6012	TOTAL PRESSURE RECOVERY = SUPERSONIC.....	0.3749

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

STREAM THRUST.....	6387. (LBF)	TOTAL PRESSURE RECOVERY = SUBSONIC.....	0.1637
NET THRUST.....	1370. (LBF)	INLET PROCESS EFFICIENCY = SUPERSONIC.....	0.6916
SPECIFIC IMPULSE.....	1762. (LBF-SEC/LBM)	INLET PROCESS EFFICIENCY = SUBSONIC.....	0.9044
THRUST COEFFICIENT.....	0.5495	KINETIC ENERGY EFFICIENCY = SUPERSONIC.....	0.9368
		KINETIC ENERGY EFFICIENCY = SUBSONIC.....	0.6866
		ENTHALPY AT PO = SUPERSONIC.....	-2.95 (BTU/LBM)
		ENTHALPY AT PO = SUBSONIC.....	30.66 (BTU/LBM)

COMBUSTOR

MOMENTUM AND FORCES

INLET FRICTION DRAG.....	114.0 (LBF)	FUEL-AIR RATIO.....	0.0287
INLET MOMENTUM CHANGE.....	-759.6 (LBF)	EQUIVALENCE RATIO.....	0.864
COMBUSTOR FRICTION DRAG.....	-12.30 (LBF)	COMBUSTOR EFFICIENCY.....	0.690
COMBUSTOR STRUT DRAG.....	807. (LBF)	TOTAL PRESSURE RATIO.....	0.1410
COMBUSTOR MOMENTUM CHANGE.....	44.05 (LBF)	COMBUSTOR EFFECTIVENESS.....	0.6857
NOZZLE FRICTION DRAG.....	-0.00 (LBF)	INJECTOR DISCHARGE COEFFICIENTS 0.6278, 0.6728, 0.7742, 0.7000	
NOZZLE STRUT DRAG.....	1213. (LBF)		
NOZZLE MOMENTUM CHANGE.....	45.54 (LBF)		
NOZZLE PRESSURE INTEGRAL.....	-1067. (LBF)		
EXTERNAL FRICTION DRAG.....	-1113. (LBF)		
EXTERNAL PRESSURE INTEGRAL.....	-1230. (LBF)		
TOTAL EXTERNAL DRAG.....	-1108. (LBF)		
CAVITY FORCE.....	-937. (LBF)		
CALCULATED LOAD CELL FORCE.....	-719. (LBF)		
MEASURED LOAD CELL FORCE.....	0.0, -156.6, -121.2,		
FUEL VACUUM SPECIFIC IMPULSE.....			

NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8.....	0.9544
NOZZLE COEFFICIENT = C1.....	0.8773
PROCESS EFFICIENCY.....	0.8953
KINETIC ENERGY EFFICIENCY.....	0.6978

STATIONS

FUEL INJECTORS

NOMINAL COWL LEADING EDGE.....	34.864 (IN)
SPIKE TRANSLATION.....	0.3364 (IN)
INLET THROAT.....	40.400 (IN)
COWL LEADING EDGE.....	35.221 (IN)
NOZZLE SHROUD TRAILING EDGE.....	73.561 (IN)
NOZZLE PLUG TRAILING EDGE.....	67.313 (IN)
STRUT LEADING EDGE.....	56.077 (IN)
STRUT TRAILING EDGE.....	65.077 (IN)
COMBUSTOR EXIT.....	65.077 (IN)

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.322	B
1C	44.300	
2A	48.797	D
2C	46.250	E
3A	54.087	
3B	56.272	
4	44.622	

Reading 60

$t = 223.19 \text{ sec.}$

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S U M M A R Y R E P O R T

P	T	H	S	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	A	A/C	POMTH	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	3														
0.000	747.749	2988	655.9( 791)	1.2931	28.966	2373											
0.000	0.388	405	-31.8( 97)	1.3989	28.965	986	5.994	5908	1.826	0.10626	26.815	0.9852	5022	9.757	187.3		
SPIKE TIP NS	2	0	4														
0.600	18.075	2988	655.9( 791)	1.2930	28.965	2373											
0.600	16.334	2920	655.3( 771)	1.2951	28.965	2348	0.398	1014	2.081	0.10626	26.815	0.9852	4967	1.674	185.2		
WIND TUNNEL	3	0	0														
0.000	747.749	2988	655.9( 791)	1.2931	28.966	2373											
0.000	0.381	402	-32.3( 97)	1.3988	28.965	983	6.013	5911	1.826	0.10482	26.451	0.9852	4955	9.628	187.3		
SPIKE TIP NS	4	0	0														
0.600	18.075	2988	655.9( 791)	1.2930	28.965	2373											
0.600	16.388	2922	646.0( 772)	1.2951	28.965	2509	0.391	997	2.081	0.10482	26.451	0.9852	4955	1.624	187.3		
INLET THROAT	5	0	3														
40.400	283.617	2928	647.8( 773)	1.2950	28.966	2351											
40.400	15.903	1450	229.0( 358)	1.3507	28.965	1834	2.497	4578	1.886	0.94098	26.815	0.1113	4269	66.949	189.2		
INLET UPNRSK	6	0	3														
40.400	283.617	2928	647.8( 773)	1.2950	28.966	2351											
40.400	13.655	1394	214.1( 343)	1.3540	28.965	1800	2.588	4639	1.886	0.85548	26.815	0.1224	4311	61.933	160.8		
INLET DNRSK	7	0	4														
40.400	122.103	2928	647.8( 773)	1.2950	28.966	2351											
40.400	108.778	2827	617.5( 748)	1.2982	28.966	2810	0.491	1232	1.944	0.65548	26.815	0.1224	4311	16.372	160.8		
COMBUSTOR	8	1	21														
40.410	207.767	2865	654.6( 818)	1.2992	26.338	2836											
40.470	13.771	1471	228.4( 384)	1.3519	26.338	1927	2.397	4618	2.037	0.94731	26.999	0.1113	4268	67.987	158.1	0.21	0.07
COMBUSTOR	9	2	21														
41.314	192.998	2785	651.7( 793)	1.3028	26.363	2806											
41.314	17.918	1553	274.7( 419)	1.3483	26.362	1980	2.194	4343	2.035	0.94988	26.999	0.1110	4154	64.084	153.9	0.21	0.01
COMBUSTOR	10	3	21														
41.379	192.767	2773	651.4( 790)	1.3033	26.351	2802											
41.379	18.212	1553	278.0( 419)	1.3484	26.351	1980	2.183	4323	2.034	0.94887	26.999	0.1111	4146	63.746	153.6	0.21	0.00
COMBUSTOR	11	4	21														
41.500	189.400	2770	650.9( 789)	1.3035	26.350	2800											
41.500	19.541	1587	288.2( 429)	1.3467	26.349	2000	2.130	4260	2.035	0.94988	26.999	0.1110	4130	62.886	153.0	0.21	0.00
COMBUSTOR	12	5	4														
42.400	159.749	2842	645.7( 810)	1.2999	26.643	2826											
42.400	24.780	1813	326.5( 494)	1.3356	26.643	2125	1.880	3996	2.054	0.94194	26.999	0.1119	4064	58.499	150.5	0.21	0.08
COMBUSTOR	13	6	5														
44.099	112.003	3508	634.4(1013)	1.2673	27.426	2839											
44.099	46.425	2897	450.5( 817)	1.2887	27.431	2801	1.228	3194	2.124	0.90865	26.999	0.1160	4060	45.103	150.4	0.21	0.72
COMBUSTOR	14	7	3														
44.310	111.159	3526	632.8(1018)	1.2663	27.433	2844											
44.310	47.653	2935	435.1( 829)	1.2870	27.438	2815	1.203	3145	2.125	0.90728	26.999	0.1162	4057	44.341	150.3	0.21	0.74
COMBUSTOR	15	8	3														
44.600	109.230	3547	628.5(1024)	1.2650	27.492	2848											
44.600	50.502	3004	446.2( 850)	1.2842	27.498	2841	1.144	3020	2.127	0.90357	26.999	0.1167	4044	42.412	149.8	0.21	0.77
COMBUSTOR	16	9	2														
44.814	109.212	3545	628.4(1024)	1.2650	27.491	2848											
44.814	50.478	3002	446.1( 849)	1.2843	27.497	2840	1.140	3020	2.127	0.90354	26.999	0.1167	4043	42.411	149.7	0.21	0.77
COMBUSTOR	17	10	8														
46.250	101.728	3036	638.7( 970)	1.2923	24.017	2850											
46.250	48.016	2552	465.5( 800)	1.3085	24.018	2829	1.120	2944	2.302	0.86080	27.287	0.1238	4019	39.382	147.3	0.53	0.20
COMBUSTOR	18	11	2														
46.260	101.671	3037	638.6( 970)	1.2922	24.019	2850											
46.260	47.999	2554	465.4( 800)	1.3085	24.019	2830	1.120	2944	2.303	0.86016	27.287	0.1239	4020	39.357	147.3	0.53	0.20

READING = 0060 BLOCK = 130 TIME = 223.103 MACH 6.0 PT = 747.749 TT = 2088.1

P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	N	A/AC	MUMIM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	4												
47.310	96.392	3174	627.8(10.6)	1.2853	24.183	2896										
47.310	46.199	2686	451.1( 8.3)	1.3019	24.184	2681	1.109	2974	2.317	0.60050	27.287	0.1331	4097	36.997	150.1	0.53 0.27
COMBUSTOR	0	20	13	2												
47.339	96.272	3177	627.5(10.7)	1.2852	24.187	2897										
47.339	46.302	2691	451.4( 8.5)	1.3016	24.188	2683	1.106	2969	2.317	0.79947	27.287	0.1333	4098	36.886	150.2	0.53 0.27
COMBUSTOR	0	21	14	4												
48.110	91.243	3338	619.9(10.7)	1.2770	24.369	2909										
48.110	47.048	2882	452.2( 9.9)	1.2928	24.372	2757	1.051	2897	2.332	0.74589	27.287	0.1428	4178	33.581	153.1	0.53 0.34
COMBUSTOR	0	22	15	6												
48.779	87.124	2932	634.3(10.3)	1.2985	21.584	2903										
48.779	36.160	2583	419.6( 8.2)	1.3171	21.584	2690	1.218	3278	2.506	0.69406	27.590	0.1552	4248	35.357	154.0	0.87 0.16
COMBUSTOR	0	23	16	2												
48.789	87.069	2933	634.2(10.3)	1.2984	21.586	2903										
48.789	36.102	2584	419.2( 8.2)	1.3171	21.586	2691	1.219	3281	2.506	0.69316	27.590	0.1554	4250	35.339	154.0	0.87 0.16
COMBUSTOR	0	24	17	4												
49.319	83.984	3037	629.7(10.4)	1.2934	21.665	3002										
49.319	33.042	2444	395.9( 8.4)	1.3136	21.686	2714	1.260	3420	2.519	0.64826	27.590	0.1662	4339	34.456	157.3	0.87 0.19
COMBUSTOR	0	25	18	5												
50.729	74.473	3437	618.7(12.5)	1.2734	22.051	3141										
50.729	31.731	2847	377.6( 9.1)	1.2942	22.053	2892	1.205	3473	2.561	0.55250	27.590	0.1950	4503	29.818	165.4	0.87 0.31
COMBUSTOR	0	26	19	4												
52.829	66.710	3697	604.8(12.3)	1.2587	22.328	3219										
52.829	22.575	2911	278.6(10.1)	1.2879	22.339	2899	1.399	4040	2.584	0.45284	27.590	0.2379	4840	28.430	175.4	0.87 0.39
COMBUSTOR	0	27	20	3												
53.329	67.686	3734	601.8(13.7)	1.2565	22.371	3229										
53.329	21.042	2909	258.4(10.6)	1.2874	22.383	2894	1.437	4145	2.588	0.43433	27.590	0.2480	4891	27.979	177.3	0.87 0.40
COMBUSTOR	0	28	21	4												
54.079	66.152	3787	597.6(13.8)	1.2531	22.433	3203										
54.079	19.177	2911	231.7(10.8)	1.2884	22.448	2890	1.486	4279	2.592	0.40942	27.590	0.2631	4901	27.223	179.8	0.87 0.42
COMBUSTOR	0	29	22	3												
54.839	65.279	3809	593.4(13.6)	1.2517	22.464	3248										
54.839	17.287	2873	202.6( 9.2)	1.2873	22.480	2890	1.546	4422	2.594	0.38717	27.590	0.2782	5024	26.609	182.1	0.87 0.43
COMBUSTOR	0	30	23	4												
55.760	63.297	3873	588.8(13.9)	1.2475	22.539	3265										
55.760	15.944	2898	179.2(10.1)	1.2853	22.559	2895	1.580	4527	2.600	0.36361	27.590	0.2962	5092	25.583	184.6	0.87 0.45
COMBUSTOR	0	31	24	5												
56.264	49.805	4325	586.5(15.5)	1.2146	23.009	3369										
56.264	15.209	3461	188.9(12.2)	1.2555	23.082	3039	1.458	4460	2.644	0.29281	27.590	0.3679	5258	20.296	190.6	0.87 0.60
COMBUSTOR	0	32	25	5												
56.319	57.412	3936	586.3(14.4)	1.2429	22.608	3280										
56.319	11.502	2809	112.6( 9.5)	1.2874	22.634	2819	1.727	4868	2.612	0.29193	27.590	0.3690	5262	22.087	190.7	0.87 0.47
COMBUSTOR	0	33	26	3												
56.459	57.243	3945	585.7(14.6)	1.2424	22.618	3282										
56.459	11.400	2813	109.7( 9.6)	1.2872	22.644	2820	1.731	4881	2.613	0.28993	27.590	0.3717	5270	21.983	191.0	0.87 0.48
COMBUSTOR	0	34	27	7												
56.539	50.713	4310	585.3(15.9)	1.2159	22.997	3366										
56.539	14.808	3414	175.8(11.4)	1.2579	23.067	3042	1.488	4527	2.641	0.29308	27.590	0.3675	5276	20.618	191.2	0.87 0.60
COMBUSTOR	0	35	28	3												
56.819	51.378	4298	584.2(15.4)	1.2169	22.987	3363										
56.819	14.400	3373	163.8(11.7)	1.2598	23.055	3027	1.515	4586	2.639	0.29211	27.590	0.3688	5293	20.820	191.8	0.87 0.59
COMBUSTOR	0	36	29	4												
57.045	52.519	4254	583.2(15.7)	1.2204	22.942	3354										
57.045	13.781	3283	148.1(11.5)	1.2644	23.004	2995	1.558	4666	2.635	0.29156	27.590	0.3695	5305	21.142	192.3	0.87 0.58
COMBUSTOR	0	37	30	4												
57.769	56.450	4089	580.3(14.7)	1.2326	22.777	3317										
57.769	11.800	2974	100.8(10.2)	1.2740	22.816	2879	1.702	4899	2.621	0.28705	27.590	0.3753	5335	21.854	193.4	0.87 0.53

READING = 0060 BLOCK = 130 TIME = 223.193 MACH 6.0 PT = 747.749 TT = 2988.1

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	N	A/AC	MUMTM	O	IVAC	PMI	ETAC
COMBUSTOR	0	38	31	8													
58.789	104.583	3268	576.7	(1159)	1.2809	21.989	3077										
58.789	5.962	1655	42.1	(547)	1.3403	21.991	2200	2.404	5565	2.513	0.28521	27.590	0.3777	5349	24.664	193.9	0.87 0.29
COMBUSTOR	0	39	32	7													
60.799	47.859	4752	570.5	(1730)	1.1794	23.313	3442										
60.799	19.300	4132	230.8	(1471)	1.2091	23.687	3238	1.273	4122	2.661	0.29513	27.590	0.3650	5339	18.908	193.5	0.87 0.78
COMBUSTOR	0	40	33	5													
62.219	51.889	4493	565.6	(1629)	1.2014	23.241	3398										
62.219	16.444	3665	166.0	(1289)	1.2421	23.349	3113	1.436	4471	2.644	0.30313	27.590	0.3553	5331	21.065	193.2	0.87 0.67
COMBUSTOR	0	41	34	5													
64.683	45.109	4881	556.2	(1780)	1.1672	23.692	3458										
64.683	21.969	4620	276.7	(1585)	1.1861	23.889	3303	1.132	3739	2.667	0.28734	27.590	0.3749	5316	16.698	192.7	0.87 0.85
COMBUSTOR	0	42	35	4													
65.059	41.685	4919	554.6	(1795)	1.1625	23.738	3461										
65.059	21.050	4518	300.5	(1624)	1.1775	23.938	3324	1.073	3565	2.674	0.26713	27.590	0.4032	5314	14.802	192.6	0.87 0.88
COMBUSTOR	0	43	36	21													
65.059	41.685	5008	627.6	(1834)	1.1580	23.652	3491										
65.059	8.095	3984	13.7	(1403)	1.2054	24.089	3188	1.760	5342	2.689	0.26713	27.590	0.4032	5509	23.008	202.6	0.87 0.88
NOZZLE	AE	44	37	5													
67.295	41.685	4919	554.6	(1780)	1.1625	23.738	3461										
67.295	1.300	2702	536.2	(896)	1.2723	24.174	2659	2.779	7388	2.674	0.05561	27.590	1.9371	6980	6.385	253.0	0.87 0.88
NOZZLE	PO	45	38	8													
67.295	41.685	4919	554.6	(1780)	1.1625	23.738	3461										
67.295	0.388	2067	772.0	(661)	1.2968	24.175	2588	3.470	8147	2.674	0.02394	27.590	4.4990	7434	3.032	269.5	0.87 0.88
NOZZLE	AE	46	39	5													
67.295	41.685	5008	627.6	(1834)	1.1580	23.652	3491										
67.295	1.303	2826	487.9	(933)	1.2674	24.173	2714	2.752	7471	2.689	0.05561	27.590	1.9371	7074	6.456	256.4	0.87 0.88
NOZZLE	PO	47	40	8													
67.295	41.685	5008	627.6	(1834)	1.1580	23.652	3491										
67.295	0.388	2153	781.0	(692)	1.2931	24.173	2393	3.458	8275	2.689	0.02335	27.590	4.6135	7355	3.003	273.8	0.87 0.88
PICTIVE	COMBUSTOR	67	60	0													
65.059	283.617	5328	554.6	(1957)	1.1663	24.190	3574										
65.059	0.388	1481	1154.9	(452)	1.3214	24.680	1986	4.658	9249	2.515	0.03873	27.590	2.7813	8208	5.567	297.5	0.87 1.00
PICTIVE	NOZZLE	68	61	0													
67.295	24.249	4835	528.7	(1760)	1.1584	23.710	3427										
67.295	1.686	3158	356.6	(1071)	1.2527	24.167	2891	2.334	6656	2.714	0.05561	27.590	1.9371	6544	5.752	237.2	0.87 0.88

READING = 0060 BLOCK = 130 TIME = 223.193 MAGN 0.0 PI = 747.744 TI = 2988.1

XARS	P-IB	P-OB	PDA	DOX	W-IB	G-OB	CAMALL	P-TH/PSO	F-18/PTO	P-OB/PSO	P-UB/PTO
6.981E-01	1.070E 00	0.000	-4.404E-01	0.000	0.000	0.000	2.470E-02	2.755E 00	1.831E-03	0.000	0.000
1.436E 01	1.070E 00	0.000	-3.562E 01	0.000	0.000	0.000	1.634E 02	2.755E 00	1.431E-03	0.000	0.000
3.070E 01	2.225E 00	0.000	-1.692E 01	0.000	0.000	0.000	5.055E 02	5.730E 00	2.976E-03	0.000	0.000
3.508E 01	3.929E 00	0.000	-3.686E 02	0.000	0.000	0.000	6.805E 02	1.012E 01	5.254E-03	0.000	0.000
3.520E 01	3.935E 00	5.765E 00	-4.351E 02	0.000	0.000	0.000	6.850E 02	1.018E 01	5.286E-03	1.484E 01	7.709E-03
3.555E 01	4.020E 00	5.728E 00	-4.332E 02	0.000	0.000	0.000	7.205E 02	1.018E 01	5.286E-03	1.475E 01	7.660E-03
3.585E 01	3.967E 00	3.589E 00	-4.432E 02	0.000	0.000	0.000	7.531E 02	1.022E 01	5.305E-03	4.185E 00	4.800E-03
3.606E 01	3.935E 00	2.388E 00	-4.704E 02	0.000	0.000	0.000	7.725E 02	1.031E 01	5.322E-03	6.149E 01	5.434E-03
3.648E 01	4.228E 00	4.063E 00	-4.917E 02	0.000	0.000	0.000	6.165E 02	1.088E 01	5.632E-03	1.046E 01	5.933E-03
3.701E 01	4.290E 00	6.176E 00	-5.179E 02	0.000	0.000	0.000	6.722E 02	1.105E 01	5.737E-03	1.891E 01	6.262E-03
3.733E 01	4.181E 00	7.450E 00	-5.314E 02	0.000	0.000	0.000	9.065E 02	1.077E 01	5.591E-03	1.918E 01	9.963E-03
3.803E 01	3.940E 00	1.266E 01	-5.480E 02	0.000	0.000	0.000	9.831E 02	1.015E 01	5.269E-03	3.237E 01	1.733E-02
3.835E 01	5.563E 00	1.546E 01	-5.476E 02	0.000	0.000	0.000	1.019E 03	1.433E 01	7.440E-03	3.982E 01	2.068E-02
3.875E 01	7.606E 00	1.511E 01	-5.998E 02	0.000	0.000	0.000	1.064E 03	1.950E 01	1.017E-02	3.891E 01	2.021E-02
3.882E 01	7.957E 00	1.505E 01	-5.503E 02	0.000	0.000	0.000	1.072E 03	2.009E 01	1.064E-02	3.870E 01	2.013E-02
3.901E 01	8.932E 00	1.542E 01	-5.508E 02	0.000	0.000	0.000	1.094E 03	2.300E 01	1.194E-02	3.971E 01	2.062E-02
3.933E 01	1.425E 01	1.604E 01	-5.574E 02	0.000	0.000	0.000	1.130E 03	3.679E 01	1.915E-02	4.130E 01	2.145E-02
3.950E 01	1.719E 01	1.310E 01	-5.658E 02	0.000	0.000	0.000	1.150E 03	4.470E 01	2.895E-02	3.735E 01	1.752E-02
3.982E 01	1.780E 01	7.635E 00	-6.033E 02	0.000	0.000	0.000	1.187E 03	4.603E 01	2.391E-02	1.964E 01	1.020E-02
4.000E 01	1.825E 01	7.072E 00	-6.033E 02	0.000	0.000	0.000	1.200E 03	4.700E 01	2.445E-02	1.810E 01	9.398E-03
4.032E 01	2.072E 01	9.975E 00	-6.725E 02	0.000	0.000	0.000	1.246E 03	5.339E 01	2.773E-02	1.839E 01	7.991E-03
4.060E 01	2.138E 01	6.095E 00	-6.802E 02	0.000	0.000	0.000	1.255E 03	5.500E 01	2.856E-02	1.570E 01	8.151E-03
4.041E 01	2.143E 01	6.110E 00	-6.410E 02	0.000	0.000	0.000	1.257E 03	5.592E 01	2.866E-02	1.573E 01	8.171E-03
4.131E 01	2.832E 01	7.448E 00	-7.263E 02	0.000	0.000	0.000	1.364E 03	7.599E 01	3.796E-02	1.918E 01	9.960E-03
4.138E 01	2.888E 01	7.544E 00	-7.435E 02	0.000	0.000	0.000	1.371E 03	7.437E 01	3.862E-02	1.943E 01	1.009E-02
4.150E 01	2.881E 01	9.269E 00	-7.569E 02	0.000	0.000	0.000	1.388E 03	7.677E 01	3.877E-02	2.387E 01	1.240E-02
4.246E 01	2.662E 01	2.294E 01	-8.064E 02	0.000	0.000	0.000	1.501E 03	6.856E 01	3.561E-02	5.906E 01	3.067E-02
4.410E 01	4.652E 01	4.672E 01	-7.641E 02	0.000	0.000	0.000	1.699E 03	1.200E 02	6.230E-02	1.191E 02	6.187E-02
4.431E 01	4.916E 01	4.658E 01	-7.836E 02	0.000	0.000	0.000	1.725E 03	1.266E 02	6.574E-02	1.188E 02	6.172E-02
4.480E 01	5.512E 01	4.588E 01	-7.893E 02	0.000	0.000	0.000	1.784E 03	1.420E 02	7.372E-02	1.181E 02	6.135E-02
4.481E 01	5.509E 01	4.587E 01	-7.697E 02	0.000	0.000	0.000	1.785E 03	1.419E 02	7.367E-02	1.181E 02	6.134E-02
4.625E 01	5.095E 01	4.508E 01	-7.441E 02	0.000	0.000	0.000	1.962E 03	1.312E 02	6.814E-02	1.161E 02	6.028E-02
4.626E 01	5.097E 01	4.507E 01	-7.232E 02	0.000	0.000	0.000	1.962E 03	1.311E 02	6.811E-02	1.161E 02	6.028E-02
4.731E 01	4.798E 01	4.409E 01	-6.505E 02	0.000	0.000	0.000	2.094E 03	1.234E 02	6.407E-02	1.146E 02	5.950E-02
4.734E 01	4.812E 01	4.407E 01	-6.800E 02	0.000	0.000	0.000	2.097E 03	1.239E 02	6.436E-02	1.145E 02	5.948E-02
4.811E 01	5.407E 01	4.002E 01	-5.790E 02	0.000	0.000	0.000	2.277E 03	9.312E 01	4.836E-02	9.312E 01	4.836E-02
4.878E 01	3.615E 01	3.616E 01	-4.426E 02	0.000	0.000	0.000	2.277E 03	9.312E 01	4.836E-02	9.312E 01	4.836E-02
4.879E 01	3.612E 01	3.610E 01	-4.407E 02	0.000	0.000	0.000	2.277E 03	9.312E 01	4.836E-02	9.312E 01	4.836E-02
4.932E 01	3.308E 01	3.304E 01	-3.452E 02	0.000	0.000	0.000	2.342E 03	8.509E 01	4.419E-02	8.509E 01	4.419E-02
5.073E 01	3.175E 01	3.173E 01	-1.058E 02	0.000	0.000	0.000	2.525E 03	8.111E 01	4.244E-02	8.111E 01	4.244E-02
5.263E 01	2.257E 01	2.257E 01	-1.932E 02	0.000	0.000	0.000	2.789E 03	5.813E 01	3.019E-02	5.813E 01	3.019E-02
5.333E 01	2.104E 01	2.104E 01	2.499E 02	0.000	0.000	0.000	2.851E 03	5.419E 01	2.814E-02	5.419E 01	2.814E-02
5.408E 01	1.918E 01	1.918E 01	3.277E 02	0.000	0.000	0.000	2.948E 03	4.938E 01	2.565E-02	4.938E 01	2.565E-02
5.464E 01	1.729E 01	1.729E 01	3.684E 02	0.000	0.000	0.000	3.048E 03	4.452E 01	2.312E-02	4.452E 01	2.312E-02
5.576E 01	1.594E 01	1.594E 01	4.752E 02	0.000	0.000	0.000	3.164E 03	4.106E 01	2.132E-02	4.106E 01	2.132E-02
5.626E 01	1.521E 01	1.521E 01	6.440E 02	0.000	0.000	0.000	3.206E 03	3.917E 01	2.034E-02	3.917E 01	2.034E-02
5.632E 01	1.512E 01	1.512E 01	6.483E 02	0.000	0.000	0.000	3.206E 03	3.917E 01	2.034E-02	3.917E 01	2.034E-02
5.646E 01	1.492E 01	1.492E 01	6.581E 02	0.000	0.000	0.000	3.210E 03	2.028E 01	1.033E-02	3.896E 01	2.028E-02
5.654E 01	1.481E 01	1.481E 01	6.581E 02	0.000	0.000	0.000	3.231E 03	2.028E 01	1.033E-02	3.896E 01	2.028E-02
5.682E 01	1.440E 01	1.440E 01	6.632E 02	0.000	0.000	0.000	3.245E 03	3.813E 01	1.800E-02	3.813E 01	1.800E-02
5.704E 01	1.378E 01	1.378E 01	6.699E 02	0.000	0.000	0.000	3.280E 03	3.708E 01	1.926E-02	3.708E 01	1.926E-02
5.777E 01	1.180E 01	1.180E 01	7.314E 02	0.000	0.000	0.000	3.309E 03	3.549E 01	1.843E-02	3.549E 01	1.843E-02
5.879E 01	1.982E 00	5.962E 00	7.314E 02	0.000	0.000	0.000	3.402E 03	3.039E 01	1.578E-02	3.039E 01	1.578E-02
6.080E 01	1.930E 00	5.962E 00	7.551E 02	0.000	0.000	0.000	3.793E 03	4.970E 01	2.581E-02	4.970E 01	2.581E-02
6.222E 01	1.644E 01	1.644E 01	7.551E 02	0.000	0.000	0.000	3.972E 03	4.235E 01	2.199E-02	4.235E 01	2.199E-02



READING = 0000 BLOCK = 130 TIME = 223.193 MACH 6.0 PT = 147.749 IT = 2000.1

YAS	P-1R	P-09	PDA	QDX	W21H	Q-0H	CAMALL	P-T1-7-150	1-1R/PT0	P-0H/P80	P-0H/PT0
6.468E 01	2.197E 01	2.197E 01	7.551E 02	-4.415E 03	-2.044E 03	-2.352E 03	4.289E 03	5.657E 01	2.938E-02	5.657E 01	2.938E-02
6.506E 01	2.089E 01	2.281E 01	7.551E 02	-4.459E 03	-2.080E 03	-2.379E 03	4.337E 03	5.379E 01	2.793E-02	5.379E 01	2.793E-02
6.510E 01	2.089E 01	2.290E 01	7.551E 02	-4.444E 03	-2.082E 03	-2.382E 03	4.342E 03	5.374E 01	2.793E-02	5.374E 01	2.793E-02
6.530E 01	1.986E 01	2.335E 01	7.551E 02	-4.447E 03	-2.090E 03	-2.397E 03	4.368E 03	5.110E 01	2.657E-02	5.110E 01	2.657E-02
6.696E 01	1.138E 01	9.240E 00	9.332E 02	-4.655E 03	-2.351E 03	-2.503E 03	4.563E 03	2.931E 01	1.522E-02	2.931E 01	1.522E-02
6.763E 01	8.195E 00	9.195E 00	1.125E 03	-4.712E 03	-2.170E 03	-2.542E 03	4.665E 03	2.110E 01	1.096E-02	2.368E 01	1.230E-02
6.840E 01	4.535E 00	7.030E 00	1.325E 03	-4.775E 03	-2.389E 03	-2.587E 03	4.760E 03	1.148E 01	6.065E-03	1.810E 01	9.401E-03
6.912E 01	3.561E 00	5.005E 00	1.452E 03	-4.834E 03	-2.202E 03	-2.632E 03	4.844E 03	9.169E 00	4.762E-03	1.289E 01	6.693E-03
6.973E 01	2.735E 00	4.194E 00	1.531E 03	-4.882E 03	-2.211E 03	-2.671E 03	4.922E 03	7.043E 00	3.658E-03	1.080E 01	5.608E-03
7.068E 01	2.109E 00	2.930E 00	1.625E 03	-4.931E 03	-2.233E 03	-2.730E 03	5.036E 03	5.430E 00	2.820E-03	7.545E 00	3.918E-03
7.111E 01	1.825E 00	2.711E 00	1.662E 03	-4.931E 03	-2.266E 03	-2.755E 03	5.088E 03	4.700E 00	2.441E-03	6.980E 00	3.625E-03
7.264E 01	1.065E 00	1.930E 00	1.749E 03	-5.058E 03	-2.238E 03	-2.819E 03	5.273E 03	4.741E 00	1.424E-03	4.970E 00	2.581E-03
7.279E 01	9.900E-01	1.695E 00	1.759E 03	-5.094E 03	-2.239E 03	-2.824E 03	5.290E 03	4.549E 00	1.324E-03	4.365E 00	2.267E-03
7.354E 01	1.082E 00	5.200E-01	1.792E 03	-5.096E 03	-2.245E 03	-2.851E 03	5.374E 03	2.789E 00	1.447E-03	1.339E 00	6.959E-04
7.354E 01	1.082E 00	5.137E-01	1.792E 03	-5.096E 03	-2.245E 03	-2.851E 03	5.375E 03	2.787E 00	1.448E-03	1.323E 00	6.870E-04
7.467E 01	1.245E 00	0.000	1.810E 03	-5.100E 03	-2.253E 03	-2.907E 03	5.426E 03	3.206E 00	1.665E-03	0.000	0.000
7.772E 01	2.205E 00	0.000	1.887E 03	-5.113E 03	-2.269E 03	-2.844E 03	5.525E 03	5.678E 00	2.949E-03	0.000	0.000
8.162E 01	1.500E 00	0.000	1.966E 03	-5.131E 03	-2.286E 03	-2.884E 03	5.630E 03	3.863E 00	2.006E-03	0.000	0.000
8.443E 01	1.185E 00	0.000	1.996E 03	-5.137E 03	-2.302E 03	-2.884E 03	5.684E 03	3.052E 00	1.585E-03	0.000	0.000
8.729E 01	1.755E 00	0.000	2.031E 03	-5.173E 03	-2.329E 03	-2.844E 03	5.707E 03	4.519E 00	2.347E-03	0.000	0.000
8.729E 01	1.756E 00	0.000	2.031E 03	-5.173E 03	-2.329E 03	-2.844E 03	5.707E 03	4.522E 00	2.349E-03	0.000	0.000

READING = 0000 BLOCK = 130 TIME = 223.143 PACH 6.0 PT = 747.744 IT = 2400.1

X	DDHAG	CURAC	CF	MC
4.040E 01	1.159E 02	1.159E 02	2.218E+03	4.365E+02
4.041E 01	1.973E+01	1.161E 02	2.734E+03	3.640E+02
4.131E 01	1.830E 00	1.344E 02	2.450E+03	4.775E+02
4.132E 01	1.199E 00	1.356E 02	2.398E+03	4.897E+02
4.150E 01	2.193E 00	1.377E 02	2.407E+03	5.130E+02
4.246E 01	1.698E 01	1.547E 02	2.464E+03	5.855E+02
4.410E 01	2.630E 01	1.810E 02	2.655E+03	7.774E+02
4.431E 01	3.236E 00	1.843E 02	2.987E+03	6.911E+02
4.480E 01	7.768E 00	1.920E 02	3.001E+03	6.957E+02
4.481E 01	2.164E+01	1.922E 02	3.001E+03	6.957E+02
4.625E 01	2.273E 01	2.150E 02	3.300E+03	6.267E+02
4.626E 01	1.605E+01	2.151E 02	3.300E+03	6.267E+02
4.731E 01	1.575E 01	2.305E 02	2.874E+03	7.043E+02
4.732E 01	3.746E+01	2.309E 02	2.950E+03	6.852E+02
4.811E 01	9.983E 00	2.408E 02	2.941E+03	6.751E+02
4.878E 01	8.912E 00	2.498E 02	3.238E+03	5.599E+02
4.879E 01	1.387E+01	2.499E 02	2.854E+03	6.391E+02
4.932E 01	6.568E 00	2.65E 02	2.808E+03	6.119E+02
5.073E 01	1.598E 01	2.724E 02	2.792E+03	5.775E+02
5.253E 01	2.181E 01	2.942E 02	2.833E+03	4.560E+02
5.333E 01	5.105E 00	2.994E 02	2.936E+03	4.140E+02
5.408E 01	7.742E 00	3.072E 02	2.919E+03	3.941E+02
5.488E 01	7.840E 00	3.188E 02	2.911E+03	3.669E+02
5.576E 01	8.964E 00	3.238E 02	2.691E+03	3.465E+02
5.626E 01	2.992E 00	3.268E 02	2.675E+03	3.116E+02
5.627E 01	4.19E+01	3.272E 02	3.044E+03	2.522E+02
5.686E 01	1.134E 00	3.284E 02	3.331E+03	2.649E+02
5.687E 01	6.740E+01	3.290E 02	3.035E+03	2.645E+02
5.688E 01	2.352E 00	3.314E 02	3.035E+03	2.881E+02
5.702E 01	1.830E 00	3.332E 02	3.016E+03	2.821E+02
5.777E 01	5.952E 00	3.392E 02	2.962E+03	2.549E+02
5.819E 01	8.955E 00	3.480E 02	2.863E+03	1.640E+02
6.000E 01	1.539E 01	3.634E 02	2.616E+03	3.888E+02
6.022E 01	1.056E 01	3.740E 02	3.185E+03	3.953E+02
6.488E 01	1.895E 01	3.929E 02	3.163E+03	3.319E+02
6.506E 01	2.477E 00	3.954E 02	3.357E+03	3.017E+02
6.510E 01	2.584E+01	3.957E 02	3.448E+03	3.072E+02
6.530E 01	1.113E 00	3.970E 02	3.445E+03	3.064E+02
6.696E 01	1.134E 01	4.083E 02	3.329E+03	2.220E+02
6.733E 01	4.286E 00	4.126E 02	3.309E+03	2.007E+02
6.808E 01	4.513E 00	4.171E 02	3.252E+03	1.545E+02
6.912E 01	3.620E 00	4.207E 02	3.211E+03	1.258E+02
7.068E 01	3.623E 00	4.234E 02	3.182E+03	1.082E+02
7.111E 01	1.461E 00	4.265E 02	3.139E+03	8.584E+01
7.268E 01	4.466E 00	4.330E 02	3.126E+03	7.942E+01
7.292E 01	3.847E+01	4.333E 02	3.070E+03	5.807E+01
7.354E 01	1.440E 00	4.348E 02	3.055E+03	5.343E+01
7.467E 01	8.581E+01	4.356E 02	2.985E+03	3.580E+01
7.772E 01	2.227E 00	4.379E 02	2.944E+03	3.575E+01
8.162E 01	2.489E 00	4.403E 02	3.091E+03	7.690E+01
8.443E 01	1.082E 00	4.414E 02	3.020E+03	5.716E+01
8.729E 01	4.629E+01	4.419E 02	2.976E+03	4.751E+01
8.729E 01	0.000	4.419E 02	3.013E+03	6.376E+01
8.729E 01	0.000	4.419E 02	3.013E+03	6.380E+01

ORIGINAL PAGE IS  
OF POOR QUALITY

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# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1519. (LBF)  
 MEASURED THRUST..... 1615. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1961. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2084. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.6077  
 MEASURED THRUST COEFFICIENT..... 0.6461

REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED

STREAM THRUST..... 6631. (LBF)  
 NET THRUST..... 1608. (LBF)  
 SPECIFIC IMPULSE..... 2074. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.6428

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9852  
 ADDITIVE DRAG COEFFICIENT..... 0.0005  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1610  
 DELTA P12..... 0.1183 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.3793  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1634  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.6934  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9049  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9343  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8856  
 ENTHALPY AT P0 = SUPERSONIC..... -3.95 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 30.02 (BTU/LBM)

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 115.9 (LBF)  
 INLET MOMENTUM CHANGE..... -756.0 (LBF)  
 COMBUSTOR FRICTION DRAG..... 279.5 (LBF)  
 COMBUSTOR STRUT DRAG..... -13.98 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 104.5 (LBF)  
 NOZZLE FRICTION DRAG..... 46.47 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1230. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1276. (LBF)  
 EXTERNAL FRICTION DRAG..... 54.99 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1203. (LBF)  
 TOTAL EXTERNAL DRAG..... -1258. (LBF)  
 TOTAL STRUT DRAG..... -13.98 (LBF)  
 CAVITY FORCE..... -1200. (LBF)  
 CALCULATED LOAD CELL FORCE..... -939. (LBF)  
 MEASURED LOAD CELL FORCE..... -843. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE 0.0. -163.2. -123.0.

## COMBUSTOR

FUEL-AIR RATIO..... 0.0289  
 EQUIVALENCE RATIO..... 0.869  
 COMBUSTOR EFFICIENCY..... 0.878  
 TOTAL PRESSURE RATIO..... 0.1470  
 COMBUSTOR EFFECTIVENESS..... 0.8036  
 INJECTOR DISCHARGE COEFFICIENTS 0.8183. 0.7734. 0.6817.

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9374  
 NOZZLE COEFFICIENT = C1..... 0.8543  
 PROCESS EFFICIENCY..... 0.8452  
 KINETIC ENERGY EFFICIENCY..... 0.8582

## STATIONS

NOMINAL COWL LEADING EDGE..... 30.884 (IN)  
 SPIKE TRANSLATION..... 0.3166 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COWL LEADING EDGE..... 35.203 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.543 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.295 (IN)  
 STRUT LEADING EDGE..... 56.459 (IN)  
 STRUT TRAILING EDGE..... 65.059 (IN)  
 COMBUSTOR EXIT..... 65.059 (IN)

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.304	
1C	44.300	
2A	48.779	D
2C	46.250	E
3A	54.069	
3B	56.254	
4	44.804	

Reading 60

$t = 230.39 \text{ sec.}$

S U M M A R Y R E P O R T

	P	T	H	GAMMA	MULT	SONV	MACH	VFL	S	P/A	"	A/C	MUTM	O	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	748.249	2983	654.4( 769)	1.2932	28.966	2573											
0.000	0.380	404	-32.0( 97)	1.3909	28.965	984	5.996	5903	1.825	0.10632	26.843	0.9857	5023	9.793	187.1		
SPINE TIP NS	2	0	4														
0.000	18.075	2983	654.4( 769)	1.2931	28.965	2573											
0.000	16.336	2915	643.9( 770)	1.2933	28.965	2546	0.398	1012	2.081	0.10632	26.843	0.9857	4969	1.673	185.1		
WIND TUNNEL	3	0	0														
0.000	748.249	2983	654.4( 769)	1.2932	28.966	2573											
0.000	0.381	401	-32.3( 96)	1.3908	28.965	982	6.015	5905	1.825	0.10492	26.490	0.9857	4958	9.629	187.2		
SPINE TIP NS	4	0	0														
0.000	18.075	2983	654.4( 769)	1.2931	28.965	2573											
0.000	16.386	2917	644.5( 770)	1.2932	28.965	2547	0.391	996	2.081	0.10492	26.490	0.9857	4958	1.623	187.2		
INLET THROAT	5	0	3														
40.400	281.070	2928	647.6( 773)	1.2950	28.966	2551											
40.400	15.981	1854	330.0( 359)	1.3505	28.965	1836	2.490	4871	1.887	0.94155	26.843	0.1113	4269	66.885	199.0		
INLET UPN8K	6	0	3														
40.400	281.070	2928	647.6( 773)	1.2950	28.966	2551											
40.400	13.720	1398	215.1( 344)	1.3538	28.965	1802	2.581	4652	1.887	0.85595	26.843	0.1224	4311	61.881	160.6		
INLET DN8K	7	0	4														
40.400	122.100	2928	647.6( 773)	1.2950	28.966	2551											
40.400	104.883	2826	617.2( 743)	1.2952	28.966	2510	0.491	1233	1.944	0.85595	26.843	0.1224	4311	16.400	160.6		
COMBUSTOR	8	1	21														
40.410	241.914	2993	650.7( 795)	1.2972	27.736	2594											
40.410	15.739	1483	334.8( 382)	1.3501	27.735	1895	2.408	4562	1.965	0.94470	26.936	0.1113	4268	66.976	158.5	0.10	0.07
COMBUSTOR	9	2	5														
41.302	173.000	2840	653.6( 811)	1.3003	26.578	2628											
41.302	23.567	1752	316.7( 477)	1.3384	26.578	2094	1.960	4106	2.051	0.94985	27.030	0.1111	4120	60.612	192.4	0.21	0.06
COMBUSTOR	10	3	2														
41.312	172.573	2841	653.6( 812)	1.3003	26.579	2629											
41.312	23.584	1755	317.4( 478)	1.3382	26.579	2096	1.957	4102	2.051	0.95062	27.030	0.1110	4119	60.595	192.4	0.21	0.06
COMBUSTOR	11	4	2														
41.377	168.269	2849	653.2( 814)	1.2999	26.589	2632											
41.377	24.225	1783	322.6( 486)	1.3370	26.589	2111	1.926	4068	2.094	0.95065	27.030	0.1110	4106	60.094	191.9	0.21	0.07
COMBUSTOR	12	5	3														
41.500	158.532	2884	652.6( 824)	1.2983	26.628	2644											
41.500	25.813	1864	335.1( 510)	1.3334	26.627	2154	1.850	3986	2.061	0.95096	27.030	0.1110	4083	58.908	191.0	0.21	0.10
COMBUSTOR	13	6	4														
42.460	144.900	2769	646.3( 788)	1.3023	26.522	2599											
42.460	26.329	1828	356.2( 500)	1.3359	26.522	2140	1.781	3809	2.057	0.94156	27.030	0.1121	3956	59.742	146.4	0.21	0.01
COMBUSTOR	14	7	4														
44.097	107.097	3079	632.9( 883)	1.2883	26.904	2707											
44.097	41.624	2777	439.6( 693)	1.3085	26.905	2448	1.271	3110	2.104	0.90970	27.030	0.1160	3850	43.969	142.4	0.21	0.32
COMBUSTOR	15	8	2														
44.310	105.378	3084	631.1( 884)	1.2880	26.917	2709											
44.310	43.286	2315	447.6( 704)	1.3071	26.917	2464	1.230	3030	2.105	0.90799	27.030	0.1162	3834	42.755	141.8	0.21	0.33
COMBUSTOR	16	9	2														
44.800	102.240	3079	626.3( 882)	1.2881	26.926	2706											
44.800	47.040	2378	464.6( 724)	1.3068	26.927	2492	1.141	2845	2.107	0.90437	27.030	0.1167	3796	39.980	140.4	0.21	0.34
COMBUSTOR	17	10	2														
44.812	102.181	3077	626.2( 882)	1.2881	26.925	2705											
44.812	47.066	2377	464.8( 724)	1.3069	26.925	2492	1.141	2842	2.107	0.90436	27.030	0.1167	3794	39.940	140.4	0.21	0.34
COMBUSTOR	18	11	14														
46.250	93.700	2808	637.0( 828)	1.3120	23.556	2687											
46.250	50.325	2245	510.0( 702)	1.3243	23.556	2505	1.007	2521	2.273	0.86163	27.322	0.1238	3737	33.759	136.8	0.54	0.04

READING = 0060 BLOCK = 138 TIME = 230.393 MAGN 0.0 PT = 748.249 TI = 2983.2

	P	T	H	GAMMA	MOLNT	SONV	MACH	VEL	S	W/A	"	A/AC	MUMTM	Q	IVAL	PHI	ETAC
COMBUSTOR	0	19	12	2													
46.260	93.663	2609	636.91	826	1.3120	23.557	2688										
46.260	50.348	2246	510.01	702	1.3243	23.557	2505	1.006	2520	2.273	0.86118	27.322	0.1239	3737	33.724	136.8	0.54 0.04
COMBUSTOR	0	20	13	4													
47.310	89.657	2744	625.31	873	1.3054	23.712	2740										
47.310	52.727	2519	510.61	759	1.3163	23.712	2584	0.927	2396	2.290	0.80129	27.322	0.1331	3832	29.834	140.3	0.54 0.10
COMBUSTOR	0	21	14	2													
47.337	89.603	2746	625.01	874	1.3053	23.715	2741										
47.337	52.859	2523	510.91	761	1.3161	23.715	2586	0.924	2390	2.290	0.80016	27.322	0.1333	3835	24.722	140.3	0.54 0.10
COMBUSTOR	0	22	15	4													
48.110	85.994	2914	617.01	930	1.2972	23.896	2805										
48.110	50.857	2580	497.11	812	1.3084	23.896	2650	0.924	2449	2.308	0.78664	27.322	0.1429	3941	28.417	144.2	0.54 0.18
COMBUSTOR	0	23	16	8													
48.777	80.785	2669	629.51	939	1.3108	21.285	2858										
48.777	40.870	2556	489.61	781	1.3247	21.285	2642	1.070	2827	2.491	0.69502	27.628	0.1552	4028	30.536	145.8	0.88 0.09
COMBUSTOR	0	24	17	2													
48.787	80.728	2671	629.41	940	1.3104	21.287	2859										
48.787	40.182	2558	489.31	781	1.3246	21.287	2643	1.071	2831	2.491	0.69411	27.628	0.1558	4030	30.539	145.9	0.88 0.09
COMBUSTOR	0	25	18	4													
49.317	78.014	2785	624.91	983	1.3050	21.392	2906										
49.317	35.487	2508	439.01	798	1.3213	21.392	2662	1.146	3050	2.506	0.64916	27.628	0.1662	4129	30.768	149.5	0.88 0.13
COMBUSTOR	0	26	19	8													
50.727	70.469	3137	614.11	1114	1.2882	21.719	3041										
50.727	31.937	2817	406.31	910	1.3059	21.720	2797	1.183	3225	2.548	0.55326	27.628	0.1950	4364	27.728	159.0	0.88 0.23
COMBUSTOR	0	27	20	4													
52.827	64.619	3417	600.41	1220	1.2737	22.003	3136										
52.827	22.687	2707	312.01	939	1.2967	22.008	2818	1.348	3799	2.577	0.45346	27.628	0.2379	4645	26.774	168.1	0.88 0.31
COMBUSTOR	0	28	21	3													
53.327	63.907	3422	597.61	1229	1.2723	22.033	3143										
53.327	20.821	2882	289.01	929	1.2992	22.037	2804	1.401	3929	2.579	0.43493	27.628	0.2480	4696	26.556	170.0	0.88 0.32
COMBUSTOR	0	29	22	4													
54.077	62.436	3594	593.41	1249	1.2693	22.091	3159										
54.077	18.917	2882	263.01	928	1.2983	22.097	2799	1.452	4066	2.585	0.40998	27.628	0.2631	4766	25.904	172.5	0.88 0.34
COMBUSTOR	0	30	23	3													
54.837	61.646	3515	589.41	1257	1.2681	22.120	3165										
54.837	16.987	2843	234.61	912	1.2993	22.126	2778	1.517	4213	2.587	0.38770	27.628	0.2782	4828	25.385	174.8	0.88 0.35
COMBUSTOR	0	31	24	4													
55.760	59.756	3577	584.81	1280	1.2644	22.189	3184										
55.760	15.841	2865	212.11	919	1.2975	22.197	2783	1.552	4319	2.593	0.36407	27.628	0.2963	4895	24.435	177.2	0.88 0.37
COMBUSTOR	0	32	25	5													
56.262	47.182	3006	582.61	1406	1.2371	22.616	3301										
56.262	14.908	3173	220.31	1109	1.2727	22.648	2978	1.430	4257	2.639	0.29316	27.628	0.3679	5061	19.396	183.2	0.88 0.50
COMBUSTOR	0	33	26	5													
56.317	53.644	3598	582.31	1311	1.2595	22.272	3207										
56.317	11.352	2803	150.41	894	1.2985	22.283	2746	1.693	4649	2.607	0.29233	27.628	0.3690	5065	21.119	183.3	0.88 0.39
COMBUSTOR	0	34	27	3													
56.457	53.684	3666	581.71	1314	1.2591	22.281	3209										
56.457	11.850	2806	147.61	895	1.2983	22.293	2747	1.697	4661	2.608	0.29023	27.628	0.3717	5073	21.022	183.6	0.88 0.39
COMBUSTOR	0	35	28	6													
56.537	48.033	3594	581.41	1441	1.2380	22.606	3298										
56.537	14.508	3131	207.71	1092	1.2745	22.637	2960	1.461	4324	2.637	0.29354	27.628	0.3675	5078	19.724	183.8	0.88 0.49
COMBUSTOR	0	36	29	3													
56.817	48.632	3584	580.21	1437	1.2387	22.599	3295										
56.817	14.100	3094	196.31	1076	1.2761	22.629	2945	1.488	4383	2.635	0.29251	27.628	0.3688	5095	19.924	184.4	0.88 0.49
COMBUSTOR	0	37	30	3													
57.043	49.620	3907	579.31	1423	1.2412	22.564	3286										
57.043	13.532	3019	182.31	1049	1.2794	22.591	2916	1.529	4457	2.631	0.29207	27.628	0.3693	5107	20.231	184.9	0.88 0.48

READING # 0060 BLOCK # 138 TIME # 230.393 MACH 6.0 PT # 748.249 TT # 2983.2

	P	T	M	GAMMA	MOLWT	SONV	MACH	VEL	S	M/A	M	A/AC	MUPT	G	IVAC	PHI	ETAC
COMBUSTOR	0	36	31	4													
52.798	3812	576.3	(1370)	1.2501	22.436	3250											
57.767	11.712	2766	140.2	(953)	1.2905	22.454	2811	1.662	4671	2.618	0.28744	27.628	0.3753	5137	20.867	185.9	0.88 0.44
COMBUSTOR	0	39	32	8													
58.787	94.650	3055	572.9	(1081)	1.2908	21.736	3003										
58.787	5.962	1364	5.9	(519)	1.3470	21.737	2195	2.426	5327	2.510	0.28560	27.628	0.3777	5151	23.642	186.4	0.88 0.23
COMBUSTOR	0	40	33	6													
60.797	46.423	4313	566.9	(1564)	1.2142	22.972	3367										
60.797	17.450	3599	232.8	(1271)	1.2488	23.039	3114	1.313	4088	2.653	0.29554	27.628	0.3650	5142	19.776	186.1	0.88 0.61
COMBUSTOR	0	41	34	4													
62.217	48.428	4829	562.3	(1531)	1.2299	22.894	3348										
62.217	16.869	3459	211.3	(1216)	1.2567	22.949	3069	1.366	4191	2.645	0.30355	27.628	0.3553	5134	19.769	185.8	0.88 0.58
COMBUSTOR	0	42	35	4													
64.681	43.140	4501	553.4	(1637)	1.1979	23.207	3399										
64.681	21.354	3999	298.0	(1428)	1.2232	23.296	3231	1.106	3575	2.665	0.28773	27.628	0.3749	5120	13.984	185.3	0.88 0.68
COMBUSTOR	0	43	36	4													
65.057	39.899	4322	551.8	(1649)	1.1942	23.244	3402										
65.057	21.519	4096	324.6	(1467)	1.2162	23.335	3258	1.035	3372	2.673	0.26750	27.628	0.4032	5118	14.018	185.3	0.88 0.70
COMBUSTOR	0	44	37	21													
65.057	39.899	4053	626.1	(1700)	1.1803	23.194	3440										
65.057	21.457	4223	390.8	(1520)	1.2073	23.307	3298	1.040	3431	2.689	0.26750	27.628	0.4032	5163	14.265	186.9	0.88 0.70
NOZZLE	AE	05	38	5													
67.293	39.899	4322	551.8	(1625)	1.1942	23.244	3402										
67.293	1.166	2203	647.9	(738)	1.2075	23.404	2487	2.844	7073	2.673	0.05568	27.628	1.9371	6652	6.121	240.8	0.88 0.70
NOZZLE	P0	46	39	5													
67.293	39.899	4322	551.8	(1625)	1.1942	23.244	3402										
67.293	0.388	1730	632.7	(554)	1.3198	23.404	2203	3.498	7699	2.673	0.02614	27.628	4.1269	7021	3.127	254.1	0.88 0.70
NOZZLE	AE	47	40	5													
67.293	39.899	4053	626.1	(1700)	1.1803	23.194	3440										
67.293	1.210	2263	603.4	(782)	1.2930	23.404	2547	2.818	7177	2.689	0.05568	27.628	1.9371	6764	6.211	244.8	0.88 0.70
NOZZLE	P0	48	41	5													
67.293	39.899	4053	626.1	(1700)	1.1803	23.194	3440										
67.293	0.388	1812	604.1	(582)	1.3159	23.404	2250	3.486	7846	2.689	0.02544	27.628	4.2400	7159	3.102	254.1	0.88 0.70
FICTIVE	COMBUSTOR	08	61	0													
65.057	281.070	5336	551.8	(1966)	1.1654	24.129	3580										
65.057	0.388	1493	1167.8	(457)	1.3204	24.635	1995	4.650	9276	2.521	0.03841	27.628	2.8085	8245	5.537	298.4	0.88 1.00
FICTIVE	NOZZLE	09	62	0													
67.293	26.045	4468	525.2	(1622)	1.1927	23.242	3377										
67.293	1.411	2527	541.1	(644)	1.2868	23.404	2628	2.505	6584	2.702	0.05568	27.628	1.9371	6354	5.697	230.0	0.88 0.70

READING = 0060 BLOCK = 138 TIME = 230.393 MACH 0.0 PL = /46644 T1 = 2905.2

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XAB8	P=18	P=08	PDA	QUM	Q=18	Q=08	CANALL	P=18/P80	P=18/P10	P=08/P80	P=08/P10
6.981E+01	1.070E 00	0.000	4.404E+01	0.000	0.000	0.000	2.470E+02	2.759E 00	1.430E+03	0.000	0.000
1.836E 01	1.070E 00	0.000	-3.562E 01	0.000	0.000	0.000	1.634E 02	2.754E 00	1.430E+03	0.000	0.000
3.070E 01	2.230E 00	0.000	-1.694E 02	0.000	0.000	0.000	5.053E 02	5.750E 00	2.980E+03	0.000	0.000
3.508E 01	3.930E 00	0.000	-3.632E 02	0.000	0.000	0.000	6.804E 02	1.015E 01	5.260E+03	0.000	0.000
3.519E 01	3.951E 00	5.757E 00	-3.351E 02	0.000	0.000	0.000	6.855E 02	1.020E 01	5.289E+03	1.484E 01	7.694E+03
3.520E 01	3.959E 00	5.721E 00	-4.356E 02	0.000	0.000	0.000	6.858E 02	1.021E 01	5.290E+03	1.475E 01	7.645E+03
3.555E 01	4.025E 00	3.586E 00	-4.437E 02	0.000	0.000	0.000	7.208E 02	1.036E 01	5.379E+03	9.247E 00	4.793E+03
3.587E 01	3.973E 00	1.650E 00	-4.597E 02	0.000	0.000	0.000	7.530E 02	1.025E 01	5.313E+03	4.254E 00	2.205E+03
3.606E 01	3.945E 00	2.411E 00	-4.709E 02	0.000	0.000	0.000	7.727E 02	1.017E 01	5.272E+03	6.216E 00	3.222E+03
3.648E 01	4.231E 00	4.065E 00	-4.922E 02	0.000	0.000	0.000	8.164E 02	1.091E 01	5.658E+03	1.086E 01	5.433E+03
3.701E 01	4.315E 00	6.152E 00	-5.109E 02	0.000	0.000	0.000	8.722E 02	1.113E 01	5.767E+03	1.586E 01	8.222E+03
3.733E 01	4.205E 00	7.400E 00	-5.322E 02	0.000	0.000	0.000	9.064E 02	1.084E 01	5.619E+03	1.906E 01	9.890E+03
3.803E 01	3.960E 00	1.295E 01	-5.498E 02	0.000	0.000	0.000	9.632E 02	1.021E 01	5.292E+03	3.339E 01	1.731E+02
3.835E 01	5.434E 00	1.545E 01	-5.487E 02	0.000	0.000	0.000	9.832E 02	1.401E 01	7.262E+03	3.984E 01	2.065E+02
3.875E 01	7.310E 00	1.512E 01	-5.496E 02	0.000	0.000	0.000	1.019E 03	1.645E 01	9.770E+03	3.912E 01	2.028E+02
3.882E 01	7.621E 00	1.512E 01	-5.498E 02	0.000	0.000	0.000	1.072E 03	1.965E 01	1.019E+02	3.900E 01	2.081E+02
3.901E 01	6.520E 00	1.548E 01	-5.495E 02	0.000	0.000	0.000	1.094E 03	2.197E 01	1.139E+02	3.991E 01	2.069E+02
3.933E 01	1.400E 01	1.606E 01	-5.548E 02	0.000	0.000	0.000	1.130E 03	3.610E 01	1.671E+02	4.141E 01	2.147E+02
3.950E 01	1.700E 01	1.310E 01	-5.631E 02	0.000	0.000	0.000	1.150E 03	4.383E 01	2.272E+02	3.377E 01	1.750E+02
3.982E 01	1.776E 01	7.675E 00	-5.847E 02	0.000	0.000	0.000	1.187E 03	4.579E 01	2.374E+02	1.979E 01	1.026E+02
4.000E 01	1.820E 01	7.226E 00	-6.000E 02	0.000	0.000	0.000	1.209E 03	4.693E 01	2.432E+02	1.843E 01	9.658E+03
4.032E 01	2.339E 01	6.450E 01	-6.308E 02	0.000	0.000	0.000	1.246E 03	6.038E 01	3.128E+02	1.683E 01	8.680E+03
4.040E 01	2.476E 01	6.507E 00	-6.404E 02	0.000	0.000	0.000	1.256E 03	6.383E 01	3.309E+02	1.688E 01	8.749E+03
4.041E 01	2.492E 01	6.558E 00	-6.414E 02	0.000	0.000	0.000	1.257E 03	6.425E 01	3.330E+02	1.691E 01	8.745E+03
4.130E 01	3.954E 01	7.594E 01	-7.718E 02	0.000	0.000	0.000	1.362E 03	1.019E 02	5.284E+02	1.956E 01	1.015E+02
4.131E 01	3.970E 01	7.606E 01	-7.734E 02	0.000	0.000	0.000	1.363E 03	1.024E 02	5.305E+02	1.961E 01	1.016E+02
4.136E 01	4.077E 01	7.681E 01	-7.847E 02	0.000	0.000	0.000	1.371E 03	1.051E 02	5.449E+02	1.980E 01	1.037E+02
4.150E 01	4.279E 01	8.036E 01	-8.041E 02	0.000	0.000	0.000	1.386E 03	1.103E 02	5.718E+02	2.279E 01	1.101E+02
4.246E 01	3.480E 01	1.768E 01	-9.135E 02	0.000	0.000	0.000	1.501E 03	6.973E 01	4.651E+02	4.604E 01	2.387E+02
4.410E 01	5.001E 01	3.323E 01	-9.999E 02	0.000	0.000	0.000	1.699E 03	1.290E 02	6.680E+02	8.592E 01	4.442E+02
4.431E 01	5.200E 01	3.453E 01	-1.000E 03	0.000	0.000	0.000	1.725E 03	1.341E 02	6.949E+02	8.905E 01	4.616E+02
4.480E 01	5.655E 01	3.753E 01	-1.040E 03	0.000	0.000	0.000	1.745E 03	1.458E 02	7.558E+02	9.676E 01	5.016E+02
4.481E 01	5.653E 01	3.760E 01	-1.041E 03	0.000	0.000	0.000	1.746E 03	1.458E 02	7.558E+02	9.695E 01	5.035E+02
4.625E 01	5.426E 01	4.632E 01	-1.030E 03	0.000	0.000	0.000	1.963E 03	1.399E 02	7.852E+02	1.196E 02	6.199E+02
4.626E 01	5.425E 01	4.645E 01	-1.030E 03	0.000	0.000	0.000	1.964E 03	1.399E 02	7.852E+02	1.196E 02	6.207E+02
4.731E 01	5.259E 01	5.280E 01	-9.237E 02	0.000	0.000	0.000	2.094E 03	1.356E 02	7.029E+02	1.138E 02	7.085E+02
4.734E 01	5.269E 01	5.302E 01	-9.251E 02	0.000	0.000	0.000	2.097E 03	1.359E 02	7.042E+02	1.137E 02	7.087E+02
4.811E 01	5.554E 01	4.618E 01	-8.059E 02	0.000	0.000	0.000	2.194E 03	1.432E 02	7.422E+02	1.191E 02	6.171E+02
4.879E 01	4.027E 01	4.027E 01	-6.736E 02	0.000	0.000	0.000	2.277E 03	1.038E 02	5.382E+02	1.036E 02	5.382E+02
4.879E 01	4.018E 01	4.018E 01	-6.705E 02	0.000	0.000	0.000	2.278E 03	1.038E 02	5.382E+02	1.036E 02	5.382E+02
4.932E 01	3.549E 01	3.549E 01	-5.600E 02	0.000	0.000	0.000	2.345E 03	9.150E 01	4.743E+02	9.150E 01	4.743E+02
5.073E 01	3.194E 01	3.194E 01	-3.167E 02	0.000	0.000	0.000	2.322E 03	8.235E 01	4.268E+02	8.235E 01	4.268E+02
5.263E 01	2.269E 01	2.269E 01	-1.601E 01	0.000	0.000	0.000	2.789E 03	5.850E 01	3.032E+02	5.850E 01	3.032E+02
5.333E 01	2.082E 01	2.082E 01	4.054E 01	0.000	0.000	0.000	2.892E 03	5.348E 01	2.783E+02	5.348E 01	2.783E+02
5.408E 01	1.892E 01	1.892E 01	1.174E 02	0.000	0.000	0.000	2.948E 03	4.877E 01	2.526E+02	4.877E 01	2.526E+02
5.488E 01	1.699E 01	1.699E 01	1.870E 02	0.000	0.000	0.000	3.046E 03	4.380E 01	2.270E+02	4.380E 01	2.270E+02
5.576E 01	1.564E 01	1.564E 01	2.625E 01	0.000	0.000	0.000	3.164E 03	4.033E 01	2.090E+02	4.033E 01	2.090E+02
5.626E 01	1.491E 01	1.491E 01	4.307E 02	0.000	0.000	0.000	3.209E 03	3.844E 01	1.993E+02	3.844E 01	1.993E+02
5.632E 01	7.875E 00	1.483E 01	4.304E 02	0.000	0.000	0.000	3.216E 03	2.030E 01	1.052E+02	3.823E 01	1.993E+02
5.646E 01	7.875E 00	1.462E 01	4.445E 01	0.000	0.000	0.000	3.234E 03	2.030E 01	1.052E+02	3.823E 01	1.993E+02
5.654E 01	1.451E 01	1.451E 01	4.531E 02	0.000	0.000	0.000	3.245E 03	3.741E 01	1.939E+02	3.741E 01	1.939E+02
5.662E 01	1.410E 01	1.410E 01	4.690E 02	0.000	0.000	0.000	3.280E 03	3.635E 01	1.884E+02	3.635E 01	1.884E+02
5.704E 01	1.353E 01	1.353E 01	4.824E 01	0.000	0.000	0.000	3.309E 03	3.489E 01	1.808E+02	3.489E 01	1.808E+02
5.777E 01	1.171E 01	1.171E 01	5.167E 02	0.000	0.000	0.000	3.402E 03	3.020E 01	1.565E+02	3.020E 01	1.565E+02
5.879E 01	5.962E 00	5.962E 00	5.371E 02	0.000	0.000	0.000	3.532E 03	1.537E 01	7.969E+03	1.537E 01	7.969E+03
6.080E 01	1.745E 01	1.745E 01	5.399E 02	0.000	0.000	0.000	3.790E 03	4.499E 01	2.335E+02	4.499E 01	2.335E+02



XAB8	P=IB	P=OB	PDA	GUX	WDIR	Q=OB	CAMALL	P=IB/P80	P=IN/P10	P=OB/P80	P=OB/P10
6.222E 01	1.687E 01	1.687E 01	5.399E 02	-4.282E 03	-1.892E 03	-2.391E 03	3.972E 03	4.349E 01	2.250E-02	4.349E 01	2.250E-02
6.468E 01	2.135E 01	2.135E 01	5.399E 02	-4.589E 03	-1.788E 03	-2.561E 03	4.289E 03	5.506E 01	2.850E-02	5.506E 01	2.850E-02
6.506E 01	2.100E 01	2.204E 01	5.399E 02	-4.572E 03	-1.982E 03	-2.590E 03	4.337E 03	5.414E 01	2.807E-02	5.682E 01	2.905E-02
6.510E 01	2.100E 01	2.211E 01	5.399E 02	-4.576E 03	-1.983E 03	-2.593E 03	4.342E 03	5.414E 01	2.807E-02	5.701E 01	2.955E-02
6.530E 01	1.998E 01	2.247E 01	5.399E 02	-4.588E 03	-1.990E 03	-2.602E 03	4.368E 03	5.150E 01	2.670E-02	5.795E 01	3.004E-02
6.696E 01	1.147E 01	9.370E 00	7.162E 02	-4.758E 03	-2.042E 03	-2.717E 03	4.563E 03	2.957E 01	1.535E-02	2.416E 01	1.252E-02
6.763E 01	8.250E 00	9.300E 00	9.105E 02	-4.818E 03	-2.058E 03	-2.754E 03	4.665E 03	2.127E 01	1.103E-02	2.398E 01	1.243E-02
6.840E 01	4.550E 00	7.109E 00	1.110E 03	-4.871E 03	-2.073E 03	-2.798E 03	4.760E 03	1.173E 01	6.081E-03	1.833E 01	9.501E-03
6.912E 01	3.570E 00	5.060E 00	1.239E 03	-4.928E 03	-2.085E 03	-2.844E 03	4.848E 03	9.205E 00	4.771E-03	1.305E 01	6.782E-03
6.973E 01	2.740E 00	4.220E 00	1.335E 03	-4.976E 03	-2.093E 03	-2.884E 03	4.922E 03	7.065E 00	3.682E-03	1.090E 01	5.652E-03
7.068E 01	2.062E 00	2.935E 00	1.416E 03	-5.035E 03	-2.102E 03	-2.943E 03	5.036E 03	5.316E 00	2.750E-03	7.567E 00	3.922E-03
7.111E 01	1.755E 00	2.719E 00	1.449E 03	-5.073E 03	-2.105E 03	-2.967E 03	5.088E 03	4.525E 00	2.345E-03	7.010E 00	3.630E-03
7.264E 01	1.063E 00	1.950E 00	1.536E 03	-5.152E 03	-2.115E 03	-3.030E 03	5.273E 03	2.740E 00	1.420E-03	5.029E 00	2.606E-03
7.279E 01	9.950E-01	1.712E 00	1.582E 03	-5.151E 03	-2.116E 03	-3.034E 03	5.290E 03	2.565E 00	1.330E-03	4.411E 00	2.288E-03
7.354E 01	1.096E 00	5.400E-01	1.579E 03	-5.181E 03	-2.121E 03	-3.040E 03	5.374E 03	2.826E 00	1.465E-03	1.341E 00	6.950E-04
7.354E 01	1.096E 00	5.136E-01	1.580E 03	-5.181E 03	-2.121E 03	-3.040E 03	5.375E 03	2.827E 00	1.465E-03	1.324E 00	6.855E-04
7.487E 01	1.275E 00	0.000	1.605E 03	-5.241E 03	-2.128E 03	-3.113E 03	5.426E 03	3.287E 00	1.704E-03	0.000	0.000
7.772E 01	2.225E 00	0.000	1.675E 03	-5.244E 03	-2.142E 03	-3.113E 03	5.525E 03	5.737E 00	2.974E-03	0.000	0.000
8.162E 01	1.525E 00	0.000	1.755E 03	-5.270E 03	-2.157E 03	-3.113E 03	5.630E 03	3.932E 00	2.034E-03	0.000	0.000
8.443E 01	1.175E 00	0.000	1.765E 03	-5.284E 03	-2.171E 03	-3.113E 03	5.684E 03	3.030E 00	1.570E-03	0.000	0.000
8.720E 01	1.740E 00	0.000	1.820E 03	-5.304E 03	-2.195E 03	-3.113E 03	5.707E 03	4.486E 00	2.325E-03	0.000	0.000
8.720E 01	1.741E 00	0.000	1.820E 03	-5.308E 03	-2.195E 03	-3.113E 03	5.707E 03	4.489E 00	2.327E-03	0.000	0.000

X	DORAG	CURAG	CF	MC
4.040E 01	1.157E 02	1.157E 02	2.209E-03	4.358E-02
4.041E 01	1.837E-01	1.159E 02	2.490E-03	4.170E-02
4.130E 01	1.733E 01	1.233E 02	2.661E-03	5.357E-02
4.131E 01	1.819E-01	1.334E 02	2.481E-03	5.675E-02
4.138E 01	1.161E 00	1.246E 02	2.493E-03	5.740E-02
4.150E 01	1.196E 00	1.168E 02	2.523E-03	5.918E-02
4.246E 01	1.690E 01	1.537E 02	2.612E-03	5.698E-02
4.410E 01	2.612E 01	1.748E 02	2.676E-03	7.005E-02
4.431E 01	3.117E 00	1.829E 02	2.873E-03	6.597E-02
4.480E 01	7.141E 00	1.901E 02	2.901E-03	6.658E-02
4.481E 01	1.692E-01	1.902E 02	2.906E-03	6.646E-02
4.625E 01	2.015E 01	2.104E 02	3.283E-03	6.001E-02
4.626E 01	1.289E-01	2.105E 02	2.840E-03	7.065E-02
4.731E 01	1.173E 01	2.222E 02	2.829E-03	6.942E-02
4.734E 01	2.889E-01	2.225E 02	2.912E-03	6.775E-02
4.811E 01	6.103E 00	2.306E 02	2.678E-03	6.673E-02
4.878E 01	7.477E 00	2.281E 02	3.202E-03	5.645E-02
4.879E 01	1.137E-01	2.382E 02	2.848E-03	6.408E-02
4.932E 01	5.744E 00	2.440E 02	2.789E-03	6.137E-02
5.073E 01	1.441E 01	2.584E 02	2.759E-03	5.675E-02
5.281E 01	2.010E 01	2.785E 02	2.781E-03	4.544E-02
5.333E 01	4.887E 00	2.833E 02	2.899E-03	4.121E-02
5.408E 01	7.287E 00	2.906E 02	2.875E-03	3.884E-02
5.488E 01	7.170E 00	2.977E 02	2.867E-03	3.613E-02
5.576E 01	6.445E 00	3.062E 02	2.847E-03	3.412E-02
5.626E 01	2.806E 00	3.090E 02	2.831E-03	3.086E-02
5.632E 01	4.154E-01	3.094E 02	2.991E-03	2.498E-02
5.668E 01	1.087E 00	3.105E 02	2.816E-03	2.618E-02
5.658E 01	6.309E-01	3.111E 02	3.235E-03	2.667E-02
5.682E 01	2.199E 00	3.133E 02	2.984E-03	2.844E-02
5.702E 01	1.233E 00	3.150E 02	2.966E-03	2.781E-02
5.777E 01	5.999E 00	3.206E 02	2.916E-03	2.581E-02
5.879E 01	0.382E 00	3.290E 02	2.826E-03	1.643E-02
6.002E 01	1.474E 01	3.337E 02	2.564E-03	3.682E-02
6.222E 01	9.924E 00	3.537E 02	3.088E-03	3.015E-02
6.468E 01	1.759E 01	3.712E 02	3.136E-03	3.218E-02
6.506E 01	2.326E 00	3.736E 02	3.293E-03	2.986E-02
6.510E 01	2.397E-01	3.738E 02	3.373E-03	3.018E-02
6.530E 01	1.218E 00	3.750E 02	3.368E-03	3.010E-02
6.668E 01	1.668E 01	3.857E 02	3.219E-03	2.238E-02
6.763E 01	4.092E 00	3.898E 02	3.190E-03	2.026E-02
6.840E 01	4.332E 00	3.941E 02	3.125E-03	1.565E-02
6.912E 01	3.494E 00	3.976E 02	3.079E-03	1.277E-02
6.973E 01	2.607E 00	4.002E 02	3.048E-03	1.100E-02
7.068E 01	3.503E 00	4.037E 02	3.001E-03	8.655E-03
7.111E 01	1.408E 00	4.051E 02	2.986E-03	7.982E-03
7.264E 01	4.225E 00	4.095E 02	2.930E-03	5.936E-03
7.279E 01	3.465E-01	4.098E 02	2.915E-03	5.472E-03
7.354E 01	1.009E 00	4.112E 02	2.837E-03	3.677E-03
7.359E 01	2.262E-03	4.112E 02	2.837E-03	3.667E-03
7.487E 01	0.444E-01	4.121E 02	2.894E-03	5.208E-03
7.772E 01	2.184E 00	4.142E 02	2.956E-03	7.861E-03
8.162E 01	2.035E 00	4.167E 02	2.883E-03	5.887E-03
8.441E 01	1.036E 00	4.177E 02	2.834E-03	4.805E-03
8.729E 01	4.076E-01	4.182E 02	2.876E-03	6.439E-03
8.729E 01	0.000	4.182E 02	2.876E-03	6.442E-03

READING = 0060 BLOCK = 136 TIME = 230.393 MACH 0.0 PT = 748.249 TT = 2985.2

## RAYJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1326. (LBF)  
 MEASURED THRUST..... 1392. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 1692. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2015. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5318  
 MEASURED THRUST COEFFICIENT..... 0.6333  
  
 REGENERATIVE=COOLED ENGINE PERFORMANCE  
 CALCULATED  
 STREAM THRUST..... 6461. (LBF)  
 NET THRUST..... 1435. (LBF)  
 SPECIFIC IMPULSE..... 1828. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.5745

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 115.7 (LBF)  
 INLET MOMENTUM CHANGE..... -756.1 (LBF)  
 COMBUSTOR FRICTION DRAG..... 257.8 (LBF)  
 COMBUSTOR STRUT DRAG..... -12.72 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 649. (LBF)  
 NOZZLE FRICTION DRAG..... 44.60 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1236. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1280. (LBF)  
 EXTERNAL FRICTION DRAG..... 55.64 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1227. (LBF)  
 TOTAL EXTERNAL DRAG..... -1283. (LBF)  
 TOTAL STRUT DRAG..... -12.72 (LBF)  
 CAVITY FORCE..... -1199. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1153. (LBF)  
 MEASURED LOAD CELL FORCE..... -899. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE..... 0.0. -164.9. -124.5.

## STATIONS

NOMINAL COWL LEADING EDGE.....  
 SPIKE TRANSLATION.....  
 INLET THROAT.....  
 COWL LEADING EDGE.....  
 NOZZLE SHROUD TRAILING EDGE.....  
 NOZZLE PLUG TRAILING EDGE.....  
 STRUT LEADING EDGE.....  
 STRUT TRAILING EDGE.....  
 COMBUSTOR EXIT.....

34.884 (IN)  
 0.3168 (IN)  
 40.400 (IN)  
 35.201 (IN)  
 73.541 (IN)  
 87.293 (IN)  
 56.457 (IN)  
 65.057 (IN)  
 65.057 (IN)

## INLET

ANGLE OF ATTACK.....  
 MASS FLOW RATIO.....  
 ADDITIVE DRAG COEFFICIENT.....  
 LIFTING PRESSURE RECOVERY EFFICIENCY.....  
 DELTA PT2.....  
 TOTAL PRESSURE RECOVERY = SUPERSONIC.....  
 TOTAL PRESSURE RECOVERY = SUBSONIC.....  
 INLET PROCESS EFFICIENCY = SUPERSONIC.....  
 INLET PROCESS EFFICIENCY = SUBSONIC.....  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC.....  
 KINETIC ENERGY EFFICIENCY = SUBSONIC.....  
 ENTHALPY AT P0 = SUPERSONIC.....  
 ENTHALPY AT P0 = SUBSONIC.....

0.000 (DEGREES)  
 0.9857  
 0.0004  
 0.1609  
 0.1165 (PSI)  
 0.3764  
 0.1632  
 0.8924  
 0.9046  
 0.9354  
 0.8870  
 -3.80 (BTU/LBM)  
 29.92 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO.....  
 EQUIVALENCE RATIO.....  
 COMBUSTOR EFFICIENCY.....  
 TOTAL PRESSURE RATIO.....  
 COMBUSTOR EFFECTIVENESS.....  
 INJE TOR DISCHARGE COEFFICIENTS

0.0292  
 0.080  
 0.697  
 0.1417  
 0.6922  
 0.8288, 0.6301, 0.7789, 0.6827

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = CG.....  
 NOZZLE COEFFICIENT = CT.....  
 PROCESS EFFICIENCY.....  
 KINETIC ENERGY EFFICIENCY.....

0.9552  
 0.8775  
 0.9053  
 0.9000

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	A
1B	41.302	B
1C	44.300	
2A	48.777	D
2C	46.250	E
3A	54.067	
3B	56.252	
4	44.802	

Reading 60

$t = 241.19 \text{ sec.}$

SUMMARY REPORT

	P	T	M	GAMMA	MOLNT	SUNV	MACH	VEL	S	W/A	"	A/JAC	POWIM	C	IVAC	PFI	ETAC
WIND TUNNEL	1	0	5														
0.000	746.249	2985	664.8( 790)	1.2932	26.966	2574	5.995	5905	1.826	0.10632	26.845	0.9856	5025	9.756	187.2		
0.000	0.368	404	31.9( 97)	1.3989	28.965	985											
SPINE TIP NS	2	0	4														
0.000	18.062	2985	664.8( 790)	1.2931	26.965	2574	0.398	1014	2.081	0.10632	26.845	0.9858	4966	1.675	185.0		
0.000	16.320	2917	644.3( 770)	1.2953	26.965	2546											
WIND TUNNEL	3	0	0														
0.000	746.249	2985	664.8( 790)	1.2932	26.966	2574	6.016	5907	1.826	0.10481	26.464	0.9858	4955	9.622	187.2		
0.000	0.380	402	32.5( 96)	1.3988	28.965	982											
SPINE TIP NS	4	0	0														
0.000	18.062	2985	664.8( 790)	1.2931	26.965	2574	0.391	997	2.081	0.10481	26.464	0.9858	4955	1.623	187.2		
0.000	16.377	2919	644.9( 771)	1.2952	26.965	2547											
INLET THROAT	5	0	3														
0.000	206.258	2929	648.0( 774)	1.2950	26.966	2552	2.505	4586	1.886	0.94124	26.845	0.1114	4278	67.087	159.4		
0.000	15.824	1645	227.6( 356)	1.3510	28.965	1831											
INLET UPN8K	6	0	3														
0.000	286.258	2929	648.0( 774)	1.2950	26.966	2552	2.597	4666	1.886	0.85567	26.845	0.1225	4320	62.093	160.4		
0.000	13.569	1369	212.8( 342)	1.3543	28.965	1797											
INLET DN8K	7	0	4														
0.000	122.351	2929	648.0( 774)	1.2950	26.966	2552	0.490	1230	1.944	0.85567	26.845	0.1225	4320	16.353	160.9		
0.000	104.990	2828	617.8( 744)	1.2982	26.966	2510											
COMBUSTOR	8	1	3														
0.000	285.668	2929	648.0( 774)	1.2950	26.966	2552	2.503	4585	1.886	0.94112	26.845	0.1114	4277	67.054	159.3		
0.000	15.841	1446	227.9( 357)	1.3509	28.965	1831											
COMBUSTOR	9	2	21														
0.000	180.018	2884	659.3( 820)	1.2985	26.761	2638	2.165	4377	2.043	0.94911	27.019	0.1111	4174	64.555	154.5	0.19	0.07
0.000	17.520	1937	276.5( 400)	1.3432	28.761	2021											
COMBUSTOR	10	3	21														
0.000	193.320	2817	659.3( 800)	1.3016	26.689	2613	2.207	4374	2.031	0.94889	27.019	0.1112	4173	64.498	154.5	0.19	0.01
0.000	17.561	1565	277.0( 420)	1.3475	26.689	1982											
COMBUSTOR	11	4	21														
0.000	193.558	2806	659.0( 797)	1.3021	26.679	2609	2.199	4356	2.030	0.95033	27.019	0.1110	4165	64.337	154.2	0.19	0.00
0.000	17.627	1563	279.7( 420)	1.3477	26.679	1981											
COMBUSTOR	12	5	21														
0.000	190.492	2802	658.3( 796)	1.3023	26.677	2608	2.143	4291	2.031	0.95055	27.019	0.1110	4150	63.393	153.6	0.19	0.00
0.000	19.223	1598	290.3( 430)	1.3459	26.677	2002											
COMBUSTOR	13	6	4														
0.000	139.195	3067	652.2( 875)	1.2897	26.984	2700	1.665	3807	2.076	0.94122	27.019	0.1121	4070	55.680	150.6	0.19	0.27
0.000	30.427	2149	362.6( 500)	1.3206	26.984	2286											
COMBUSTOR	14	7	5														
0.000	109.480	3534	639.1(1016)	1.2660	27.563	2841	1.143	3009	2.120	0.90887	27.019	0.1161	4033	42.503	149.3	0.19	0.76
0.000	50.661	2992	458.1( 843)	1.2851	27.568	2634											
COMBUSTOR	15	8	3														
0.000	108.836	3542	637.2(1019)	1.2655	27.579	2843	1.118	2957	2.120	0.90729	27.019	0.1163	4029	41.689	149.1	0.19	0.76
0.000	51.918	3020	462.5( 852)	1.2840	27.584	2644											
COMBUSTOR	16	9	3														
0.000	107.513	3543	632.7(1019)	1.2652	27.596	2842	1.064	2831	2.121	0.90375	27.019	0.1167	4015	39.767	148.6	0.19	0.79
0.000	54.779	3065	472.5( 866)	1.2822	27.601	2661											
COMBUSTOR	17	10	2														
0.000	107.503	3542	632.6(1019)	1.2653	27.595	2842	1.064	2831	2.121	0.90376	27.019	0.1167	4015	39.762	148.6	0.19	0.79
0.000	54.778	3065	472.4( 866)	1.2822	27.600	2661											
COMBUSTOR	18	11	8														
0.000	100.835	3053	646.4( 975)	1.2914	24.036	2856	1.005	2688	2.304	0.86122	27.315	0.1238	4014	35.974	147.0	0.53	0.20
0.000	54.617	2851	502.0( 833)	1.3052	24.036	2675											



P	T	M	GAMMA	MOLWT	SDNV	MACH	VEL	S	W/A	M	A/C	PUMIN	Q	IVAC	PMI	ETAC
COMBUSTOR	0	38	51	5												
57.765	60.538	4155	594.1(1501)	1.2290	25.796	3337										
57.765	11.312	2900	77.1(1120)	1.2749	22.043	2470	1.712	5086	2.621	0.28736	27.625	0.3753	5454	22.117	197.5	0.87 0.54
COMBUSTOR	39	32	8													
58.785	110.682	3374	590.6(1200)	1.2762	25.038	3117										
58.785	5.962	1696	-57.5( 561)	1.3376	22.042	2262	2.517	5695	2.519	0.28555	27.623	0.3777	5466	25.271	197.9	0.87 0.31
COMBUSTOR	40	33	7													
60.795	49.740	4863	584.0(1776)	1.1714	23.584	3465										
60.795	18.775	4218	213.0(1505)	1.2006	23.809	3252	1.325	4309	2.684	0.29544	27.623	0.3650	5454	14.786	197.5	0.87 0.82
COMBUSTOR	41	34	5													
62.215	53.640	4632	579.0(1685)	1.1912	23.342	3428										
62.215	16.506	3796	187.7(1339)	1.2327	23.490	3147	1.459	4592	2.650	0.30350	27.623	0.3553	5444	21.656	197.1	0.87 0.72
COMBUSTOR	42	35	5													
64.679	46.514	5014	569.2(1834)	1.1575	23.787	3483										
64.679	21.241	4541	260.0(1633)	1.1732	24.051	3319	1.185	3934	2.670	0.28768	27.623	0.3749	5426	17.586	196.4	0.87 0.92
COMBUSTOR	43	36	4													
65.055	42.792	5080	567.5(1860)	1.1508	23.863	3490										
65.055	21.502	4685	289.3(1690)	1.1605	24.136	3347	1.115	3731	2.677	0.26745	27.623	0.4032	5424	15.507	196.4	0.87 0.97
COMBUSTOR	44	37	4													
65.055	42.792	5142	627.5(1888)	1.1484	23.780	3514										
65.055	23.608	4792	371.4(1736)	1.1553	24.044	3383	1.058	3580	2.688	0.26745	27.623	0.4032	5450	14.880	197.3	0.87 0.97
NOZZLE	45	38	5													
87.291	42.792	5080	567.5(1827)	1.1508	23.863	3490										
87.291	1.263	2795	-568.8( 995)	1.2574	24.933	2753	2.739	7541	2.677	0.05567	27.623	1.9371	7160	6.524	259.2	0.87 0.97
NOZZLE	46	39	5													
87.291	42.792	5080	567.5(1827)	1.1508	23.863	3490										
87.291	0.388	2268	-637.5( 729)	1.2844	24.537	2429	3.451	8385	2.677	0.02278	27.623	4.7442	7669	2.988	277.6	0.87 0.97
NOZZLE	47	40	5													
87.291	42.792	5142	627.5(1888)	1.1484	23.780	3514										
87.291	1.421	3080	-526.7(1035)	1.2924	24.830	2796	2.718	7600	2.688	0.05567	27.623	1.9371	7230	6.575	261.7	0.87 0.97
NOZZLE	48	41	5													
87.291	42.792	5142	627.5(1888)	1.1484	23.780	3514										
87.291	0.388	2342	-610.5( 756)	1.2915	24.537	2466	3.440	8483	2.688	0.02232	27.623	4.8316	7763	2.943	281.0	0.87 0.97
FICTIVE	49	61	0													
COMBUSTOR	50	62	0													
65.055	286.258	5348	567.5(1967)	1.1556	24.162	3582										
65.055	0.388	1491	-1135.5( 456)	1.3207	24.669	1992	4.661	9285	2.518	0.03850	27.623	2.7958	8250	5.566	296.7	0.87 1.00
FICTIVE	51	63	0													
NOZZLE	52	64	0													
87.291	23.605	4979	540.4(1819)	1.1465	23.819	3452										
87.291	1.634	3491	-352.2(1198)	1.2268	24.504	2948	2.267	6683	2.721	0.05567	27.623	1.9371	6648	5.782	246.7	0.87 0.97

XARS	P-1H	P-0H	PDA	DOX	W-1H	G-0H	CANALL	P-1H/P80	P-1H/P10	P-0H/P80	P-0H/P10
6.981E-01	1.075E 00	0.000	-4.401E-01	0.000	0.000	0.000	2.470E-02	2.770E 00	1.437E-03	0.000	0.000
1.836E 01	1.075E 00	0.000	-3.578E 01	0.000	0.000	0.000	1.634E 02	2.770E 00	1.437E-03	0.000	0.000
3.070E 01	2.235E 00	0.000	-1.700E 02	0.000	0.000	0.000	5.053E 02	5.759E 00	2.987E-03	0.000	0.000
3.508E 01	3.033E 00	0.000	-3.698E 02	0.000	0.000	0.000	6.804E 02	1.014E 01	5.256E-03	0.000	0.000
3.519E 01	3.958E 00	0.000	-4.360E 02	0.000	0.000	0.000	6.854E 02	1.020E 01	5.289E-03	1.484E 01	7.695E-03
3.520E 01	4.959E 00	5.760E 00	-4.361E 02	0.000	0.000	0.000	6.857E 02	1.020E 01	5.291E-03	1.475E 01	7.695E-03
3.555E 01	4.035E 00	3.576E 00	-4.444E 02	0.000	0.000	0.000	7.209E 02	1.040E 01	5.393E-03	9.214E 00	4.779E-03
3.568E 01	3.992E 00	1.650E 00	-4.603E 02	0.000	0.000	0.000	7.569E 02	1.029E 01	5.335E-03	4.252E 00	2.205E-03
3.606E 01	4.266E 00	2.404E 00	-4.718E 02	0.000	0.000	0.000	7.729E 02	1.022E 01	5.299E-03	6.194E 00	5.125E-03
3.648E 01	4.266E 00	4.025E 00	-4.932E 02	0.000	0.000	0.000	8.164E 02	1.049E 01	5.648E-03	1.037E 01	3.380E-03
3.701E 01	4.200E 00	6.072E 00	-5.198E 02	0.000	0.000	0.000	8.726E 02	1.106E 01	5.733E-03	1.565E 01	6.115E-03
3.732E 01	4.194E 00	7.287E 00	-5.333E 02	0.000	0.000	0.000	9.063E 02	1.081E 01	5.606E-03	1.678E 01	9.739E-03
3.803E 01	3.980E 00	1.290E 01	-5.509E 02	0.000	0.000	0.000	9.834E 02	1.026E 01	5.319E-03	3.325E 01	1.725E-02
3.834E 01	3.939E 00	1.541E 01	-5.503E 02	0.000	0.000	0.000	9.834E 02	1.026E 01	5.319E-03	3.325E 01	1.725E-02
3.875E 01	7.616E 00	1.527E 01	-5.514E 02	0.000	0.000	0.000	1.084E 03	1.685E 01	9.777E-03	3.941E 01	2.044E-02
3.901E 01	8.320E 00	1.559E 01	-5.511E 02	0.000	0.000	0.000	1.072E 03	1.683E 01	1.018E-02	3.936E 01	2.083E-02
3.932E 01	1.992E 01	1.909E 01	-5.565E 02	0.000	0.000	0.000	1.094E 03	2.196E 01	1.139E-02	4.016E 01	2.105E-02
3.991E 01	1.750E 01	1.755E 00	-5.642E 02	0.000	0.000	0.000	1.130E 03	3.587E 01	1.860E-02	4.146E 01	2.105E-02
4.000E 01	2.009E 01	7.577E 00	-5.996E 02	0.000	0.000	0.000	1.150E 03	4.361E 01	2.262E-02	4.055E 01	1.762E-02
4.031E 01	2.009E 01	6.500E 00	-6.261E 02	0.000	0.000	0.000	1.187E 03	4.509E 01	2.538E-02	4.055E 01	1.762E-02
4.060E 01	2.070E 01	6.986E 00	-6.332E 02	0.000	0.000	0.000	1.246E 03	5.177E 01	2.383E-02	1.953E 01	1.015E-02
4.091E 01	2.077E 01	6.997E 00	-6.339E 02	0.000	0.000	0.000	1.256E 03	5.334E 01	2.768E-02	1.778E 01	9.225E-03
4.110E 01	2.714E 01	7.699E 00	-7.197E 02	0.000	0.000	0.000	1.257E 03	5.352E 01	2.776E-02	1.803E 01	9.351E-03
4.131E 01	2.721E 01	7.009E 00	-7.206E 02	0.000	0.000	0.000	1.362E 03	6.994E 01	3.627E-02	2.036E 01	1.058E-02
4.137E 01	2.768E 01	7.975E 00	-7.273E 02	0.000	0.000	0.000	1.363E 03	7.013E 01	3.637E-02	2.036E 01	1.058E-02
4.150E 01	2.857E 01	9.870E 00	-7.400E 02	0.000	0.000	0.000	1.371E 03	7.133E 01	3.699E-02	2.055E 01	1.066E-02
4.268E 01	3.645E 01	2.440E 01	-8.033E 02	0.000	0.000	0.000	1.386E 03	7.164E 01	3.619E-02	2.843E 01	1.315E-02
4.409E 01	5.217E 01	4.915E 01	-8.145E 02	0.000	0.000	0.000	1.501E 03	9.393E 01	4.871E-02	6.289E 01	3.261E-02
4.431E 01	5.024E 01	4.960E 01	-8.154E 02	0.000	0.000	0.000	1.599E 03	1.344E 02	6.972E-02	1.278E 02	6.569E-02
4.460E 01	5.895E 01	5.061E 01	-8.216E 02	0.000	0.000	0.000	1.725E 03	1.598E 02	7.249E-02	1.278E 02	6.569E-02
4.481E 01	5.895E 01	5.061E 01	-8.216E 02	0.000	0.000	0.000	1.786E 03	1.519E 02	7.878E-02	1.304E 02	6.764E-02
4.481E 01	5.895E 01	5.061E 01	-8.216E 02	0.000	0.000	0.000	1.786E 03	1.519E 02	7.878E-02	1.304E 02	6.764E-02
4.625E 01	5.564E 01	5.360E 01	-7.518E 02	0.000	0.000	0.000	1.866E 03	1.434E 02	7.435E-02	1.381E 02	7.165E-02
4.668E 01	5.501E 01	5.362E 01	-7.510E 02	0.000	0.000	0.000	1.866E 03	1.434E 02	7.435E-02	1.381E 02	7.165E-02
4.731E 01	5.321E 01	5.379E 01	-6.720E 02	0.000	0.000	0.000	2.094E 03	1.433E 02	7.112E-02	1.438E 02	7.458E-02
4.731E 01	5.321E 01	5.379E 01	-6.720E 02	0.000	0.000	0.000	2.094E 03	1.433E 02	7.112E-02	1.438E 02	7.458E-02
4.811E 01	5.595E 01	5.584E 01	-6.177E 02	0.000	0.000	0.000	2.097E 03	1.433E 02	7.112E-02	1.438E 02	7.458E-02
4.811E 01	5.595E 01	5.584E 01	-6.177E 02	0.000	0.000	0.000	2.097E 03	1.433E 02	7.112E-02	1.438E 02	7.458E-02
4.871E 01	4.231E 01	4.231E 01	-3.521E 02	0.000	0.000	0.000	2.194E 03	1.419E 02	7.357E-02	1.251E 02	6.489E-02
4.871E 01	4.231E 01	4.231E 01	-3.521E 02	0.000	0.000	0.000	2.194E 03	1.419E 02	7.357E-02	1.251E 02	6.489E-02
4.871E 01	4.231E 01	4.231E 01	-3.521E 02	0.000	0.000	0.000	2.194E 03	1.419E 02	7.357E-02	1.251E 02	6.489E-02
4.931E 01	5.724E 01	5.724E 01	-2.401E 02	0.000	0.000	0.000	2.278E 03	1.088E 02	5.642E-02	1.088E 02	5.642E-02
5.072E 01	3.169E 01	3.169E 01	-1.467E 01	0.000	0.000	0.000	2.345E 03	9.597E 01	4.977E-02	9.597E 01	4.977E-02
5.282E 01	2.250E 01	2.250E 01	-1.467E 01	0.000	0.000	0.000	2.345E 03	9.597E 01	4.977E-02	9.597E 01	4.977E-02
5.332E 01	2.078E 01	2.078E 01	-3.692E 02	0.000	0.000	0.000	2.522E 03	5.355E 01	2.777E-02	5.355E 01	2.777E-02
5.406E 01	1.901E 01	1.901E 01	-4.462E 02	0.000	0.000	0.000	2.522E 03	5.355E 01	2.777E-02	5.355E 01	2.777E-02
5.406E 01	1.901E 01	1.901E 01	-4.462E 02	0.000	0.000	0.000	2.522E 03	5.355E 01	2.777E-02	5.355E 01	2.777E-02
5.576E 01	1.597E 01	1.597E 01	-5.934E 02	0.000	0.000	0.000	3.046E 03	4.436E 01	2.300E-02	4.436E 01	2.300E-02
5.631E 01	1.530E 01	1.530E 01	-7.640E 02	0.000	0.000	0.000	3.046E 03	4.436E 01	2.300E-02	4.436E 01	2.300E-02
5.644E 01	1.797E 00	1.522E 01	-7.683E 02	0.000	0.000	0.000	3.216E 03	2.058E 01	1.067E-02	3.923E 01	2.009E-02
5.644E 01	1.797E 00	1.522E 01	-7.683E 02	0.000	0.000	0.000	3.216E 03	2.058E 01	1.067E-02	3.923E 01	2.009E-02
5.655E 01	1.493E 01	1.493E 01	-6.042E 02	0.000	0.000	0.000	3.245E 03	3.846E 01	1.995E-02	3.846E 01	1.995E-02
5.681E 01	1.495E 01	1.495E 01	-6.042E 02	0.000	0.000	0.000	3.245E 03	3.846E 01	1.995E-02	3.846E 01	1.995E-02
5.708E 01	1.398E 01	1.378E 01	-8.172E 02	0.000	0.000	0.000	3.309E 03	3.749E 01	1.945E-02	3.749E 01	1.945E-02
5.776E 01	1.131E 01	1.131E 01	-8.512E 02	0.000	0.000	0.000	3.402E 03	2.915E 01	1.512E-02	2.915E 01	1.512E-02
5.878E 01	5.922E 00	5.922E 00	-8.712E 02	0.000	0.000	0.000	3.532E 03	1.537E 01	7.969E-03	1.537E 01	7.969E-03
6.078E 01	1.877E 01	1.877E 01	-8.741E 02	0.000	0.000	0.000	3.790E 03	4.838E 01	2.509E-02	4.838E 01	2.509E-02

ORIGINAL PAGE IS  
OF POOR QUALITY



XAB	P=IH	P=OB	P=IA	QOX	WIP	C=OB	CANALL	M=IB/P80	P=IH/P10	P=OB/P10	P=OB/P10
6.221E 01	1.651E 01	1.651E 01	0.741E 02	-4.107E 03	-1.603E 03	-2.504E 03	3.972E 03	4.254E 01	2.206E 02	4.254E 01	2.206E 02
6.444E 01	2.130E 01	2.130E 01	0.741E 02	-4.107E 03	-1.603E 03	-2.504E 03	4.249E 03	5.500E 01	2.206E 02	5.500E 01	2.206E 02
6.505E 01	2.092E 01	2.092E 01	0.741E 02	-4.426E 03	-1.700E 03	-2.726E 03	4.537E 03	5.392E 01	2.747E 02	5.392E 01	2.747E 02
6.529E 01	1.989E 01	2.255E 01	0.741E 02	-4.431E 03	-1.702E 03	-2.729E 03	4.342E 03	5.592E 01	2.747E 02	5.710E 01	2.961E 02
6.695E 01	1.127E 01	9.440E 00	0.741E 02	-4.435E 03	-1.702E 03	-2.729E 03	4.342E 03	5.125E 01	2.658E 02	5.811E 01	3.014E 02
6.762E 01	1.152E 00	9.105E 00	1.050E 03	-4.623E 03	-1.765E 03	-2.857E 03	4.583E 03	2.904E 01	1.506E 02	2.433E 01	1.262E 02
6.839E 01	4.370E 00	6.960E 00	1.242E 03	-4.677E 03	-1.792E 03	-2.894E 03	4.865E 03	2.101E 01	1.098E 02	2.348E 01	1.217E 02
6.911E 01	3.555E 00	4.935E 00	1.567E 03	-4.734E 03	-1.799E 03	-2.938E 03	4.760E 03	1.178E 01	6.108E 03	1.794E 01	9.302E 03
6.972E 01	2.695E 00	4.185E 00	1.640E 03	-4.822E 03	-1.812E 03	-2.943E 03	4.848E 03	9.161E 00	4.751E 03	1.277E 01	6.622E 03
7.067E 01	1.934E 00	2.985E 00	1.741E 03	-4.911E 03	-1.930E 03	-3.081E 03	5.036E 03	6.945E 00	3.602E 03	1.078E 01	5.593E 03
7.110E 01	1.590E 00	2.731E 00	1.773E 03	-4.939E 03	-1.934E 03	-3.105E 03	5.088E 03	4.097E 00	2.125E 03	7.090E 00	3.677E 03
7.263E 01	1.053E 00	1.920E 00	1.858E 03	-5.010E 03	-1.945E 03	-3.165E 03	5.273E 03	2.713E 00	1.407E 03	4.948E 00	2.566E 03
7.278E 01	1.000E 00	1.687E 00	1.864E 03	-5.015E 03	-1.946E 03	-3.169E 03	5.290E 03	2.577E 00	1.336E 03	4.346E 00	2.250E 03
7.353E 01	1.157E 00	5.200E 01	1.901E 03	-5.044E 03	-1.951E 03	-3.193E 03	5.374E 03	2.981E 00	1.545E 03	1.340E 00	6.950E 04
7.354E 01	1.158E 00	5.130E 01	1.902E 03	-5.044E 03	-1.951E 03	-3.193E 03	5.375E 03	2.983E 00	1.547E 03	1.324E 00	6.866E 04
7.466E 01	1.435E 00	0.000	1.929E 03	-5.102E 03	-1.959E 03	-3.242E 03	5.427E 03	3.698E 00	1.919E 03	0.000	0.000
7.771E 01	2.160E 00	0.000	2.002E 03	-5.119E 03	-1.974E 03	-3.242E 03	5.525E 03	5.618E 00	2.913E 03	0.000	0.000
8.161E 01	1.495E 00	0.000	2.080E 03	-5.122E 03	-1.990E 03	-3.242E 03	5.630E 03	3.853E 00	1.998E 03	0.000	0.000
8.442E 01	1.200E 00	0.000	2.110E 03	-5.127E 03	-1.995E 03	-3.242E 03	5.684E 03	3.092E 00	1.606E 03	0.000	0.000
8.728E 01	1.765E 00	0.000	2.145E 03	-5.138E 03	-1.931E 03	-3.242E 03	5.707E 03	4.548E 00	2.359E 03	0.000	0.000
8.729E 01	1.766E 00	0.000	2.146E 03	-5.139E 03	-1.931E 03	-3.242E 03	5.707E 03	4.551E 00	2.360E 03	0.000	0.000

X	UDRAG	CDRAG	CF	HC
4.040E-01	1.159E-02	1.158E-02	2.210E+03	4.350E+02
4.041E-01	1.751E-01	1.160E-02	2.211E+03	4.352E+02
4.130E-01	1.725E-01	1.133E-02	2.766E+03	4.265E+02
4.131E-01	1.969E-01	1.133E-02	2.766E+03	4.265E+02
4.137E-01	1.205E-00	1.347E-02	2.335E+03	4.745E+02
4.150E-01	1.288E-00	1.369E-02	2.401E+03	5.040E+02
4.246E-01	1.676E-01	1.537E-02	2.503E+03	6.316E+02
4.409E-01	2.578E-01	1.795E-02	2.803E+03	7.562E+02
4.431E-01	3.207E-00	1.921E-02	3.048E+03	9.076E+02
4.480E-01	7.396E-00	1.901E-02	3.048E+03	7.003E+02
4.481E-01	1.437E-01	1.902E-02	3.050E+03	6.986E+02
4.625E-01	2.140E-01	2.116E-02	3.366E+03	6.450E+02
4.626E-01	1.413E-01	2.116E-02	2.994E+03	7.417E+02
4.731E-01	1.329E-01	2.250E-02	2.994E+03	7.341E+02
4.733E-01	3.102E-01	2.254E-02	3.056E+03	7.075E+02
4.811E-01	9.400E-00	2.349E-02	2.895E+03	6.952E+02
4.877E-01	1.540E-00	2.433E-02	3.272E+03	5.999E+02
4.878E-01	1.306E-00	2.433E-02	2.956E+03	6.709E+02
4.931E-01	6.531E-00	2.501E-02	2.894E+03	6.396E+02
5.072E-01	1.652E-01	2.669E-02	2.831E+03	5.781E+02
5.262E-01	2.303E-01	2.699E-02	2.832E+03	4.582E+02
5.332E-01	5.423E-00	2.950E-02	2.832E+03	4.205E+02
5.340E-01	6.068E-00	3.031E-02	2.929E+03	3.965E+02
5.483E-01	7.930E-00	3.110E-02	2.921E+03	3.695E+02
5.576E-01	9.319E-00	3.203E-02	2.922E+03	3.966E+02
5.626E-01	3.076E-00	3.234E-02	2.886E+03	3.173E+02
5.631E-01	4.571E-01	3.239E-02	3.047E+03	2.546E+02
5.645E-01	1.193E-00	3.251E-02	2.899E+03	2.679E+02
5.653E-01	6.991E-01	3.251E-02	3.335E+03	2.725E+02
5.681E-01	2.442E-00	3.262E-02	3.056E+03	2.616E+02
5.704E-01	1.697E-00	3.301E-02	3.037E+03	2.838E+02
5.776E-01	6.190E-00	3.363E-02	2.972E+03	2.949E+02
5.878E-01	1.104E-00	3.443E-02	2.836E+03	1.711E+02
6.079E-01	1.579E-01	3.612E-02	2.606E+03	3.890E+02
6.221E-01	1.094E-01	3.721E-02	3.194E+03	2.994E+02
6.468E-01	1.973E-01	3.919E-02	3.167E+03	3.330E+02
6.505E-01	2.609E-00	3.945E-02	3.367E+03	3.091E+02
6.509E-01	2.721E-01	3.945E-02	3.371E+03	3.094E+02
6.529E-01	1.368E-00	3.961E-02	3.469E+03	3.067E+02
6.695E-01	1.181E-01	4.099E-02	3.589E+03	2.235E+02
6.762E-01	4.402E-00	4.123E-02	3.372E+03	2.005E+02
6.819E-01	4.615E-00	4.170E-02	3.329E+03	1.544E+02
6.912E-01	3.690E-00	4.266E-02	3.265E+03	1.251E+02
6.972E-01	2.733E-00	4.234E-02	3.265E+03	1.075E+02
7.067E-01	3.655E-00	4.270E-02	3.320E+03	8.403E+01
7.110E-01	1.455E-00	4.255E-02	3.205E+03	7.655E+02
7.263E-01	4.458E-00	4.330E-02	3.354E+03	5.740E+03
7.274E-01	3.585E-01	4.333E-02	3.340E+03	5.311E+03
7.353E-01	1.470E-00	4.368E-02	3.078E+03	3.662E+03
7.358E-01	2.475E+03	4.368E-02	3.077E+03	3.673E+03
7.406E-01	9.257E-01	4.337E-02	3.134E+03	5.563E+03
7.771E-01	2.335E-00	4.331E-02	3.173E+03	7.569E+03
8.161E-01	2.515E-00	4.406E-02	3.104E+03	5.669E+03
8.442E-01	1.079E-00	4.416E-02	3.062E+03	4.746E+03
8.728E-01	4.711E-01	4.421E-02	3.076E+03	4.371E+03
8.729E-01	0.000	4.421E-02	3.076E+03	4.371E+03

# RAKJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1621. (LBF)  
 MEASURED THRUST..... 1562. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 2084. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2009. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.6486  
 MEASURED THRUST COEFFICIENT..... 0.6292

## REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED  
 STREAM THRUST..... 6713. (LBF)  
 NET THRUST..... 1685. (LBF)  
 SPECIFIC IMPULSE..... 2167. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.6744

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 115.8 (LBF)  
 INLET MOMENTUM CHANGE..... -749.0 (LBF)  
 COMBUSTOR FRICTION DRAG..... 278.6 (LBF)  
 COMBUSTOR STRUT DRAG..... -5.75 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 1146. (LBF)  
 NOZZLE FRICTION DRAG..... 47.65 (LBF)  
 NOZZLE STRUT DRAG..... -0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1224. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1272. (LBF)  
 EXTERNAL FRICTION DRAG..... 58.16 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1277. (LBF)  
 TOTAL EXTERNAL DRAG..... -1335. (LBF)  
 TOTAL STRUT DRAG..... -5.75 (LBF)  
 CAVITY FORCE..... -1230. (LBF)  
 CALCULATED LOAD CELL FORCE..... -953. (LBF)  
 MEASURED LOAD CELL FORCE..... -1012. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE 0.0, -167.4, -126.3,

## STATIONS

NOMINAL COHL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3148 (IN)  
 INLET THROAT..... 40.400 (IN)  
 COHL LEADING EDGE..... 35.199 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 75.534 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.291 (IN)  
 STRUT LEADING EDGE..... 56.455 (IN)  
 STRUT TRAILING EDGE..... 65.055 (IN)  
 COMBUSTOR EXIT..... 65.055 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATIO..... 0.9858  
 ADDITIVE DRAG COEFFICIENT..... 0.0004  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1612  
 DELTA PT2..... 0.1161 (PSI)  
 TOTAL PRESSURE RECOVERY = SUPERSONIC..... 0.1826  
 TOTAL PRESSURE RECOVERY = SUBSONIC..... 0.1635  
 INLET PROCESS EFFICIENCY = SUPERSONIC..... 0.8935  
 INLET PROCESS EFFICIENCY = SUBSONIC..... 0.9047  
 KINETIC ENERGY EFFICIENCY = SUPERSONIC..... 0.9362  
 KINETIC ENERGY EFFICIENCY = SUBSONIC..... 0.8871  
 ENTHALPY AT P0 = SUPERSONIC..... -4.28 (BTU/LBM)  
 ENTHALPY AT P0 = SUBSONIC..... 29.95 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0290  
 EQUIVALENCE RATIO..... 0.871  
 COMBUSTOR EFFICIENCY..... 0.969  
 TOTAL PRESSURE RATIO..... 0.1495  
 COMBUSTOR EFFECTIVENESS..... 0.8339  
 INJECTOR DISCHARGE COEFFICIENTS 0.7405, 0.7803, 0.6866,

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT = C8..... 0.9264  
 NOZZLE COEFFICIENT = C7..... 0.8617  
 PROCESS EFFICIENCY..... 0.8138  
 KINETIC ENERGY EFFICIENCY..... 0.8370

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.300	B
1C	44.300	
2A	48.775	C
2C	46.250	E
3A	54.065	
3B	56.250	
4	44.800	

Reading 60

$t = 249,29 \text{ sec.}$

03/21/75

READING = 0060 BLOCK = 159 TIME = 249.293 MACH 6.0 PT = 749.250 TT = 2986.6  
RAMJET PERFORMANCE

SUMMARY REPORT

P	T	F	S	GAMMA	MULT	SUNV	MACH	VEL	S	W/A	W	A/AC	MOMTV	Q	IVAC	PHI	ETAC
WIND TUNNEL	1	0	5														
0.000	749.250 2987	665.4(	790)	1.2931	28.966	2575											
0.000	0.389 404	-31.8(	97)	1.3989	28.965	905	5.994	5907	1.826	0.10647	26.840	0.9842	5026	9.773	187.2		
SPIKE TIP NS	2	0	4														
0.600	18.075 2987	665.4(	790)	1.2930	28.965	2575											
0.600	16.327 2918	644.8(	770)	1.2952	28.965	2547	0.399	1015	2.081	0.10647	26.840	0.9842	4963	1.680	184.9		
WIND TUNNEL	3	0	0														
0.000	749.250 2987	665.4(	790)	1.2931	28.966	2575											
0.000	0.380 402	-32.4(	96)	1.3988	28.965	982	6.016	5909	1.826	0.10484	26.430	0.9842	4950	9.628	187.3		
SPIKE TIP NS	4	0	0														
0.600	18.075 2987	665.4(	790)	1.2930	28.965	2575											
0.600	16.388 2921	645.5(	771)	1.2951	28.965	2548	0.391	997	2.081	0.10484	26.430	0.9842	4950	1.624	187.3		
INLET THROAT	5	0	3														
40.400	285.370 2933	649.3(	775)	1.2948	28.966	2553											
40.400	15.979 1453	229.6(	358)	1.3506	28.965	1835	2.497	4583	1.886	0.94500	26.840	0.1109	4277	67.305	159.4		
INLET UPNRSK	6	0	3														
40.400	285.370 2933	649.3(	775)	1.2948	28.966	2553											
40.400	13.721 1396	214.7(	343)	1.3539	28.965	1801	2.589	4664	1.886	0.85909	26.840	0.1220	4319	62.262	160.9		
INLET DNRSK	7	0	4														
40.400	122.811 2933	649.3(	775)	1.2948	28.966	2553											
40.400	105.343 2832	619.0(	745)	1.2980	28.966	2512	0.491	1232	1.944	0.85909	26.840	0.1220	4319	16.451	160.9		
COMBUSTOR	8	1	3														
40.410	284.740 2933	649.3(	775)	1.2948	28.966	2553											
40.410	15.997 1454	229.9(	359)	1.3505	28.965	1836	2.495	4581	1.887	0.94488	26.840	0.1109	4276	67.269	159.3		
COMBUSTOR	9	2	21														
41.320	168.041 2887	665.7(	834)	1.2988	26.315	2662											
41.320	20.422 1733	304.4(	476)	1.3393	26.315	2094	2.031	4252	2.076	0.95333	27.053	0.1108	4155	62.995	153.6	0.24	0.07
COMBUSTOR	10	3	21														
41.330	181.300 2806	665.6(	810)	1.3026	26.230	2632											
41.330	20.482 1646	304.9(	451)	1.3441	26.230	2048	2.075	4249	2.062	0.95409	27.053	0.1107	4153	62.999	153.5	0.24	0.01
COMBUSTOR	11	4	21														
41.395	181.090 2793	665.3(	806)	1.3034	26.217	2627											
41.395	20.874 1646	308.7(	451)	1.3443	26.217	2048	2.062	4224	2.061	0.95457	27.053	0.1106	4144	62.668	153.2	0.24	0.00
COMBUSTOR	12	5	21														
41.500	177.804 2789	664.7(	805)	1.3034	26.215	2626											
41.500	22.410 1681	319.8(	462)	1.3426	26.215	2069	2.008	4155	2.062	0.95479	27.053	0.1106	4128	61.646	152.6	0.24	0.00
COMBUSTOR	13	6	5														
42.460	125.778 3121	658.3(	906)	1.2876	26.590	2741											
42.460	36.161 2339	405.3(	658)	1.3138	26.591	2397	1.484	3558	2.116	0.94635	27.053	0.1116	4025	52.325	148.8	0.24	0.28
COMBUSTOR	14	7	4														
44.115	107.150 3415	644.1(	996)	1.2725	26.965	2831											
44.115	58.546 2993	501.6(	859)	1.2872	26.968	2665	1.002	2671	2.145	0.91176	27.053	0.1158	3983	37.843	147.2	0.24	0.55
COMBUSTOR	15	8	0														
44.310	106.977 3410	642.4(	994)	1.2727	26.965	2829											
44.310	59.524 3000	504.0(	861)	1.2870	26.968	2668	0.986	2631	2.144	0.91095	27.053	0.1159	3980	37.243	147.1	0.24	0.55
COMBUSTOR	16	9	3														
44.800	106.450 3384	637.6(	986)	1.2738	26.952	2820											
44.800	61.976 3007	510.2(	864)	1.2869	26.955	2671	0.945	2524	2.143	0.90754	27.053	0.1164	3970	35.599	146.7	0.24	0.54
COMBUSTOR	17	10	2														
44.830	106.383 3384	637.2(	986)	1.2738	26.953	2820											
44.830	61.913 3006	509.8(	864)	1.2869	26.955	2671	0.945	2525	2.143	0.90705	27.053	0.1164	3969	35.591	146.7	0.24	0.54
COMBUSTOR	18	11	8														
46.250	100.779 2955	651.0(	955)	1.2967	23.603	2841											
46.250	58.866 2608	525.2(	831)	1.3083	23.603	2601	0.936	2509	2.321	0.86495	27.348	0.1234	3993	33.719	146.0	0.57	0.16

READING = 0060 BLOCK = 159 TIME = 249.293 MACH 6.0 PT = 749.250 TT = 2986.6

	P	T	H	2	GAMMA	VOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	Q	IVAC	PHI	ETAC
COMBUSTOR	0	19	12	2														
46.260	100.747	2956	650.9	( 955)	1.2967	23.604	2841							3994	33.706	146.1	0.57	0.16
46.260	58.845	2609	525.1	( 832)	1.3082	23.605	2681	0.936	2509	2.321	0.86442	27.348	0.1235					
COMBUSTOR	0	20	13	4														
47.310	97.212	3200	639.5	(1039)	1.2847	23.870	2926							4140	32.569	151.4	0.57	0.26
47.310	56.593	2833	503.8	( 906)	1.2972	23.871	2766	0.942	2606	2.343	0.80420	27.348	0.1328					
COMBUSTOR	0	21	14	2														
47.355	97.164	3207	639.0	(1041)	1.2844	23.878	2928							4144	32.426	151.5	0.57	0.26
47.355	56.783	2842	503.9	( 909)	1.2968	23.879	2770	0.939	2600	2.344	0.80263	27.348	0.1330					
COMBUSTOR	0	22	15	4														
48.110	93.687	3430	631.3	(1118)	1.2730	24.122	3000							4274	30.847	156.3	0.57	0.36
48.110	55.403	3058	491.0	( 983)	1.2860	24.125	2847	0.931	2649	2.362	0.74923	27.348	0.1425					
COMBUSTOR	0	23	16	6														
48.795	87.997	3154	647.5	(1134)	1.2886	21.440	3070							4382	32.719	158.4	0.92	0.21
48.795	44.795	2703	464.5	( 954)	1.3039	21.441	2859	1.058	3026	2.554	0.69577	27.658	0.1552					
COMBUSTOR	0	24	17	2														
48.805	87.938	3157	647.4	(1135)	1.2885	21.443	3071							4384	32.730	158.5	0.92	0.21
48.805	44.684	2705	463.8	( 955)	1.3038	21.444	2859	1.060	3031	2.554	0.69486	27.658	0.1554					
COMBUSTOR	0	25	18	4														
49.335	85.149	3289	643.1	(1185)	1.2820	21.568	3117							4493	33.393	162.4	0.92	0.25
49.335	38.783	2754	424.6	( 972)	1.3003	21.570	2873	1.151	3306	2.568	0.64986	27.658	0.1662					
COMBUSTOR	0	26	19	5														
50.745	77.748	3641	632.8	(1321)	1.2633	21.913	3230							4740	31.227	171.4	0.92	0.35
50.745	32.462	3016	369.7	(1068)	1.2861	21.921	2966	1.223	3628	2.601	0.55386	27.658	0.1950					
COMBUSTOR	0	27	20	4														
52.845	71.704	3910	619.6	(1425)	1.2470	22.202	3304							5024	29.565	181.6	0.92	0.43
52.845	23.325	3096	268.6	(1094)	1.2789	22.222	2977	1.408	4191	2.624	0.45395	27.658	0.2379					
COMBUSTOR	0	28	21	2														
53.345	71.563	3905	616.8	(1423)	1.2472	22.203	3302							5076	29.427	183.5	0.92	0.43
53.345	21.034	3024	238.8	(1065)	1.2815	22.223	2945	1.477	4349	2.623	0.43540	27.658	0.2480					
COMBUSTOR	0	29	22	4														
54.095	69.792	3963	612.7	(1445)	1.2433	22.270	3317							5146	28.515	186.1	0.92	0.45
54.095	19.332	3038	213.3	(1069)	1.2800	22.295	2945	1.518	4471	2.628	0.41042	27.658	0.2631					
COMBUSTOR	0	30	23	3														
54.855	68.670	3993	608.8	(1457)	1.2412	22.309	3324							5209	27.758	188.4	0.92	0.46
54.855	17.587	3014	185.5	(1058)	1.2803	22.336	2931	1.570	4602	2.631	0.38812	27.658	0.2782					
COMBUSTOR	0	31	24	4														
55.760	66.140	4078	604.4	(1490)	1.2354	22.404	3344							5277	26.568	190.8	0.92	0.49
55.760	16.490	3075	165.7	(1080)	1.2766	22.439	2949	1.589	4685	2.638	0.36489	27.658	0.2959					
COMBUSTOR	0	32	25	5														
56.280	51.902	4561	602.0	(1680)	1.1973	22.913	3442							5453	21.005	197.2	0.92	0.66
56.280	15.860	3709	178.2	(1324)	1.2397	23.037	3150	1.462	4605	2.682	0.29353	27.658	0.3679					
COMBUSTOR	0	33	26	5														
56.335	59.651	4162	601.7	(1523)	1.2288	22.496	3362							5457	22.855	197.3	0.92	0.52
56.335	12.041	3015	97.2	(1055)	1.2773	22.543	2914	1.724	5024	2.651	0.29270	27.658	0.3689					
COMBUSTOR	0	34	27	3														
56.475	59.412	4174	601.1	(1527)	1.2280	22.509	3365							5466	22.737	197.6	0.92	0.52
56.475	11.956	3024	94.6	(1058)	1.2768	22.557	2917	1.726	5035	2.652	0.29060	27.658	0.3716					
COMBUSTOR	0	35	28	7														
56.555	52.730	4554	600.8	(1677)	1.1981	22.908	3441							5471	21.298	197.8	0.92	0.65
56.555	15.527	3674	166.0	(1310)	1.2417	23.031	3138	1.486	4665	2.680	0.29380	27.658	0.3675					
COMBUSTOR	0	36	29	3														
56.835	53.299	4549	599.6	(1675)	1.1986	22.906	3440							5489	21.470	198.5	0.92	0.65
56.835	15.187	3645	154.9	(1298)	1.2432	23.028	3128	1.508	4717	2.678	0.29288	27.658	0.3687					
COMBUSTOR	0	37	30	4														
57.061	55.085	4468	598.6	(1643)	1.2054	22.821	3425							5502	21.981	198.9	0.92	0.62
57.061	14.209	3486	131.1	(1236)	1.2526	22.923	3077	1.572	4837	2.672	0.29243	27.658	0.3693					

	P	T	H	GAMMA	MOLWT	SONV	MACH	VEL	S	W/A	W	A/AC	MOMTM	G	IVAC	PHI	ETAC
COMBUSTOR	0	38	31	5	595.6(11519)	1.2297	22.501	3359									
57.785	63.006	4153			56.4(1016)	1.2809	22.546	2670	1.810	5194	2.645	0.26775	27.658	0.3753	5530	23.228	199.9 0.92 0.52
COMBUSTOR	0	39	32	8	592.0(1228)	1.2749	21.785	3148									
58.805	113.482	3406			-73.4( 571)	1.3370	21.789	2282	2.528	5770	2.545	0.28591	27.658	0.3777	5541	25.638	200.3 0.92 0.31
COMBUSTOR	0	40	33	7	585.4(1832)	1.1645	23.371	3501									
60.815	50.177	4948			214.1(1574)	1.1894	23.630	3297	1.307	4310	2.694	0.29586	27.658	0.3650	5528	19.818	199.9 0.92 0.84
COMBUSTOR	0	41	34	5	580.3(1722)	1.1886	23.082	3458									
62.235	54.631	4670			146.0(1368)	1.2305	23.240	3174	1.468	4662	2.678	0.30388	27.658	0.3553	5517	22.014	199.5 0.92 0.71
COMBUSTOR	0	42	35	5	570.3(1876)	1.1540	23.527	3512									
64.699	47.231	5059			251.4(1674)	1.1676	23.813	3346	1.194	3994	2.699	0.28804	27.658	0.3749	5498	17.881	198.8 0.92 0.92
COMBUSTOR	0	43	36	4	568.6(1904)	1.1472	23.607	3521									
65.075	43.416	5131			282.2(1735)	1.1545	23.901	3375	1.122	3786	2.705	0.26778	27.658	0.4032	5495	15.755	198.7 0.92 0.98
COMBUSTOR	0	44	37	4	624.4(1929)	1.1454	23.527	3542									
65.075	43.416	5184			354.4(1774)	1.1507	23.814	3407	1.079	3676	2.715	0.26778	27.658	0.4032	5519	15.298	199.5 0.92 0.98
COMBUSTOR	0	45	38	5	568.6(1873)	1.1472	23.607	3521									
67.311	43.416	5131			-596.6(1051)	1.2503	24.386	2808	2.719	7636	2.705	0.05574	27.658	1.9371	7274	6.615	263.0 0.92 0.98
NOZZLE	AE	45	39	5	568.6(1873)	1.1472	23.607	3521									
87.311	43.416	5131			-884.6( 767)	1.2795	24.393	2478	3.442	8527	2.705	0.02224	27.658	4.8556	7814	2.947	282.5 0.92 0.98
NOZZLE	AE	47	40	5	624.4(1929)	1.1454	23.527	3542									
87.311	43.416	5184			-556.4(1089)	1.2449	24.382	2846	2.701	7687	2.715	0.05574	27.658	1.9371	7335	6.659	265.2 0.92 0.98
NOZZLE	AE	48	41	5	624.4(1929)	1.1454	23.527	3542									
87.311	43.416	5184			-858.8( 793)	1.2769	24.393	2511	3.431	8615	2.715	0.02183	27.658	4.9472	7898	2.922	285.6 0.92 0.98
FICTIVE	COMBUSTOR	58	61	0	568.6(2012)	1.1620	23.900	3612									
65.075	285.370	5397			1545-1206.5( 479)	1.3164	24.489	2032	4.638	9425	2.546	0.03758	27.658	2.8732	8388	5.505	303.3 0.92 1.00
FICTIVE	NOZZLE	69	62	0	542.0(1860)	1.1429	23.555	3481									
87.311	23.369	5024			-362.7(1264)	1.2125	24.337	2996	2.246	6729	2.751	0.05574	27.658	1.9371	6730	5.829	243.3 0.92 0.98
87.311	1.907	3624															

HEADING = 0060 BLOCK = 159 TIME = 249.293 MACH 6.0 PT = 740.250 TT = 2986.6

PAGE 4

XAUS	P-IB	P-OB	PDA	GDX	G-IB	G-CB	CAWALL	P-IB/PS0	P-IB/PT0	P-OB/PS0	P-OB/PT0
6.961E-01	1.075E 00	0.000	-4.405E-01	0.000	0.000	0.000	2.470E-02	2.764E 00	1.435E-03	0.000	0.000
1.836E 01	1.075E 00	0.000	-3.578E 01	0.000	0.000	0.000	1.634E 02	2.764E 00	1.435E-03	0.000	0.000
3.070E 01	2.235E 00	0.000	-1.700E 01	0.000	0.000	0.000	5.053E 02	5.747E 00	2.983E-03	0.000	0.000
3.508E 01	3.932E 00	0.000	-3.698E 02	0.000	0.000	0.000	6.804E 02	1.011E 01	5.249E-03	0.000	0.000
3.521E 01	3.964E 00	0.000	-4.377E 02	0.000	0.000	0.000	6.863E 02	1.019E 01	5.291E-03	1.484E 01	7.704E-03
3.522E 01	3.966E 00	5.736E 00	-4.377E 02	0.000	0.000	0.000	6.865E 02	1.020E 01	5.293E-03	1.475E 01	7.655E-03
3.555E 01	4.045E 00	3.716E 00	-4.453E 02	0.000	0.000	0.000	7.198E 02	1.040E 01	5.399E-03	9.556E 00	4.960E-03
3.588E 01	4.002E 00	1.675E 00	-4.620E 02	0.000	0.000	0.000	7.538E 02	1.029E 01	5.342E-03	4.307E 00	2.236E-03
3.606E 01	4.298E 00	2.374E 00	-4.723E 02	0.000	0.000	0.000	7.718E 02	1.023E 01	5.312E-03	6.105E 00	3.169E-03
3.648E 01	4.238E 00	4.050E 00	-4.938E 02	0.000	0.000	0.000	8.153E 02	1.090E 01	5.656E-03	1.041E 01	5.405E-03
3.701E 01	4.270E 00	6.164E 00	-5.200E 02	0.000	0.000	0.000	8.714E 02	1.098E 01	5.699E-03	1.585E 01	8.227E-03
3.734E 01	4.270E 00	7.500E 00	-5.339E 02	0.000	0.000	0.000	9.073E 02	1.076E 01	5.583E-03	1.929E 01	1.001E-02
3.803E 01	4.005E 00	1.284E 01	-5.507E 02	0.000	0.000	0.000	9.822E 02	1.030E 01	5.345E-03	3.302E 01	1.714E-02
3.836E 01	5.636E 00	1.545E 01	-5.507E 02	0.000	0.000	0.000	1.020E 03	1.449E 01	7.523E-03	3.973E 01	2.062E-02
3.875E 01	7.513E 00	1.539E 01	-5.523E 02	0.000	0.000	0.000	1.063E 03	1.932E 01	1.003E-02	3.957E 01	2.054E-02
3.883E 01	7.926E 00	1.537E 01	-5.523E 02	0.000	0.000	0.000	1.073E 03	2.038E 01	1.058E-02	3.954E 01	2.052E-02
3.901E 01	8.780E 00	1.559E 01	-5.526E 02	0.000	0.000	0.000	1.093E 03	2.258E 01	1.172E-02	4.009E 01	2.081E-02
3.934E 01	1.439E 01	1.600E 01	-5.593E 02	0.000	0.000	0.000	1.131E 03	3.700E 01	1.920E-02	4.114E 01	2.135E-02
3.950E 01	1.699E 01	1.362E 01	-5.664E 02	0.000	0.000	0.000	1.149E 03	4.368E 01	2.267E-02	3.502E 01	1.817E-02
3.985E 01	1.757E 01	8.475E 00	-5.877E 02	0.000	0.000	0.000	1.188E 03	4.518E 01	2.345E-02	2.179E 01	1.131E-02
4.000E 01	1.786E 01	8.112E 00	-6.001E 02	0.000	0.000	0.000	1.208E 03	4.592E 01	2.383E-02	2.086E 01	1.083E-02
4.033E 01	2.158E 01	7.375E 00	-6.286E 02	0.000	0.000	0.000	1.247E 03	5.549E 01	2.880E-02	1.896E 01	9.843E-03
4.040E 01	2.230E 01	7.437E 00	-6.347E 02	0.000	0.000	0.000	1.254E 03	5.736E 01	2.977E-02	1.912E 01	9.926E-03
4.041E 01	2.242E 01	7.446E 00	-6.355E 02	0.000	0.000	0.000	1.256E 03	5.764E 01	2.992E-02	1.915E 01	9.938E-03
4.132E 01	3.253E 01	8.310E 00	-7.391E 02	0.000	0.000	0.000	1.363E 03	8.366E 01	4.342E-02	2.137E 01	1.109E-02
4.133E 01	3.264E 01	8.320E 00	-7.403E 02	0.000	0.000	0.000	1.374E 03	8.395E 01	4.357E-02	2.139E 01	1.110E-02
4.139E 01	3.337E 01	8.337E 00	-7.488E 02	0.000	0.000	0.000	1.372E 03	8.581E 01	4.453E-02	2.155E 01	1.119E-02
4.150E 01	3.454E 01	1.028E 01	-7.623E 02	0.000	0.000	0.000	1.385E 03	8.881E 01	4.610E-02	2.644E 01	1.372E-02
4.246E 01	4.470E 01	2.762E 01	-8.488E 02	0.000	0.000	0.000	1.500E 03	1.149E 02	5.966E-02	7.103E 01	3.687E-02
4.411E 01	5.958E 01	5.752E 01	-8.665E 02	0.000	0.000	0.000	1.700E 03	1.532E 02	7.952E-02	1.479E 02	7.703E-02
4.431E 01	6.133E 01	5.771E 01	-8.668E 02	0.000	0.000	0.000	1.724E 03	1.577E 02	8.186E-02	1.484E 02	7.703E-02
4.480E 01	6.574E 01	5.822E 01	-8.702E 02	0.000	0.000	0.000	1.783E 03	1.690E 02	8.774E-02	1.497E 02	7.770E-02
4.483E 01	6.588E 01	5.825E 01	-8.700E 02	0.000	0.000	0.000	1.787E 03	1.686E 02	8.753E-02	1.498E 02	7.770E-02
4.625E 01	5.804E 01	5.970E 01	-7.770E 02	0.000	0.000	0.000	1.861E 03	1.492E 02	7.746E-02	1.535E 02	7.968E-02
4.626E 01	5.798E 01	5.971E 01	-7.760E 02	0.000	0.000	0.000	1.863E 03	1.491E 02	7.739E-02	1.535E 02	7.969E-02
4.735E 01	5.274E 01	6.082E 01	-6.128E 02	0.000	0.000	0.000	2.098E 03	1.356E 02	7.039E-02	1.563E 02	8.118E-02
4.811E 01	5.899E 01	5.242E 01	-4.741E 02	0.000	0.000	0.000	2.193E 03	1.501E 02	7.793E-02	1.348E 02	6.996E-02
4.879E 01	4.479E 01	4.479E 01	-3.185E 02	0.000	0.000	0.000	2.278E 03	1.152E 02	5.979E-02	1.152E 02	5.979E-02
4.880E 01	4.468E 01	4.468E 01	-3.161E 02	0.000	0.000	0.000	2.280E 03	1.149E 02	5.964E-02	1.149E 02	5.964E-02
4.933E 01	3.878E 01	3.878E 01	-2.008E 02	0.000	0.000	0.000	2.346E 03	9.973E 01	5.176E-02	9.973E 01	5.176E-02
5.074E 01	3.246E 01	3.246E 01	-6.253E 01	0.000	0.000	0.000	2.524E 03	8.348E 01	4.333E-02	8.348E 01	4.333E-02
5.284E 01	2.332E 01	2.332E 01	3.697E 02	0.000	0.000	0.000	2.790E 03	5.998E 01	3.113E-02	5.998E 01	3.113E-02
5.334E 01	2.105E 01	2.105E 01	4.273E 02	0.000	0.000	0.000	2.849E 03	5.414E 01	2.810E-02	5.414E 01	2.810E-02
5.409E 01	1.933E 01	1.933E 01	5.055E 02	0.000	0.000	0.000	2.949E 03	4.971E 01	2.580E-02	4.971E 01	2.580E-02
5.485E 01	1.759E 01	1.759E 01	5.770E 02	0.000	0.000	0.000	3.047E 03	4.523E 01	2.347E-02	4.523E 01	2.347E-02
5.576E 01	1.649E 01	1.649E 01	6.544E 02	0.000	0.000	0.000	3.163E 03	4.241E 01	2.201E-02	4.241E 01	2.201E-02
5.628E 01	1.586E 01	1.586E 01	6.330E 02	0.000	0.000	0.000	3.209E 03	4.078E 01	2.117E-02	4.078E 01	2.117E-02
5.635E 01	1.579E 01	1.579E 01	6.375E 02	0.000	0.000	0.000	3.216E 03	4.061E 01	2.106E-02	4.061E 01	2.106E-02
5.647E 01	1.562E 01	1.562E 01	6.477E 02	0.000	0.000	0.000	3.234E 03	4.018E 01	2.085E-02	4.018E 01	2.085E-02
5.655E 01	1.553E 01	1.553E 01	6.540E 02	0.000	0.000	0.000	3.244E 03	3.993E 01	2.072E-02	3.993E 01	2.072E-02
5.685E 01	1.519E 01	1.519E 01	6.740E 02	0.000	0.000	0.000	3.280E 03	3.906E 01	2.027E-02	3.906E 01	2.027E-02
5.708E 01	1.421E 01	1.421E 01	8.883E 02	0.000	0.000	0.000	3.309E 03	3.654E 01	1.896E-02	3.654E 01	1.896E-02
5.778E 01	1.107E 01	1.107E 01	9.226E 02	0.000	0.000	0.000	3.402E 03	2.848E 01	1.478E-02	2.848E 01	1.478E-02
5.840E 01	6.000E 00	6.000E 00	9.424E 02	0.000	0.000	0.000	3.532E 03	1.543E 01	8.008E-03	1.543E 01	8.008E-03
6.081E 01	1.950E 01	1.950E 01	9.454E 02	0.000	0.000	0.000	3.790E 03	5.014E 01	2.603E-02	5.014E 01	2.603E-02

ORIGINAL PAGE IS  
OF POOR QUALITY



XAGS	P-IB	P-OB	PDA	QDX	O-IB	O-OB	CANALL	P-IB/PS0	P-IB/PT0	P-OB/PS0	P-OB/PT0
6.223E 01	1.659E 01	1.659E 01	9.454E 02	-4.271E 03	-1.056E 03	-2.616E 03	3.972E 03	4.267E 01	2.215E-02	4.267E 01	2.215E-02
6.470E 01	2.150E 01	2.150E 01	9.454E 02	-4.548E 03	-1.735E 03	-2.813E 03	4.289E 03	5.528E 01	2.869E-02	5.528E 01	2.869E-02
6.507E 01	2.115E 01	2.225E 01	9.454E 02	-4.595E 03	-1.749E 03	-2.846E 03	4.337E 03	5.439E 01	2.823E-02	5.721E 01	2.969E-02
6.511E 01	2.115E 01	2.233E 01	9.454E 02	-4.600E 03	-1.750E 03	-2.849E 03	4.342E 03	5.439E 01	2.823E-02	5.741E 01	2.980E-02
6.531E 01	2.010E 01	2.272E 01	9.454E 02	-4.624E 03	-1.758E 03	-2.866E 03	4.368E 03	5.168E 01	2.682E-02	5.844E 01	3.033E-02
6.697E 01	1.135E 01	9.450E 00	1.123E 03	-4.792E 03	-1.811E 03	-2.981E 03	4.583E 03	2.919E 01	1.515E-02	2.430E 01	1.261E-02
6.764E 01	1.207E 00	9.165E 00	1.316E 03	-4.844E 03	-1.827E 03	-3.017E 03	4.665E 03	2.110E 01	1.095E-02	2.357E 01	1.223E-02
6.841E 01	4.595E 00	7.013E 00	1.514E 03	-4.903E 03	-1.844E 03	-3.059E 03	4.760E 03	1.182E 01	6.133E-03	1.803E 01	9.360E-03
6.913E 01	3.566E 00	5.000E 00	1.643E 03	-4.958E 03	-1.856E 03	-3.103E 03	4.848E 03	9.171E 00	4.760E-03	1.286E 01	6.673E-03
6.974E 01	2.695E 00	4.222E 00	1.726E 03	-5.005E 03	-1.864E 03	-3.142E 03	4.922E 03	6.930E 00	3.597E-03	1.086E 01	5.635E-03
7.069E 01	1.941E 00	3.010E 00	1.818E 03	-5.074E 03	-1.873E 03	-3.201E 03	5.036E 03	4.992E 00	2.591E-03	7.740E 00	4.017E-03
7.112E 01	1.600E 00	2.777E 00	1.850E 03	-5.102E 03	-1.876E 03	-3.226E 03	5.088E 03	4.114E 00	2.135E-03	7.142E 00	3.787E-03
7.265E 01	1.067E 00	1.950E 00	1.936E 03	-5.173E 03	-1.886E 03	-3.287E 03	5.273E 03	2.744E 00	1.429E-03	5.014E 00	2.603E-03
7.280E 01	1.015E 00	1.716E 00	1.942E 03	-5.178E 03	-1.887E 03	-3.291E 03	5.290E 03	2.610E 00	1.355E-03	4.412E 00	2.290E-03
7.355E 01	1.185E 00	5.450E-01	1.981E 03	-5.207E 03	-1.891E 03	-3.315E 03	5.374E 03	3.046E 00	1.581E-03	1.401E 00	7.274E-04
7.356E 01	1.185E 00	5.388E-01	1.981E 03	-5.207E 03	-1.891E 03	-3.315E 03	5.375E 03	3.048E 00	1.582E-03	1.385E 00	7.191E-04
7.488E 01	1.485E 00	0.000	2.009E 03	-5.263E 03	-1.898E 03	-3.364E 03	5.426E 03	3.819E 00	1.982E-03	0.000	0.000
7.773E 01	2.220E 00	0.000	2.083E 03	-5.276E 03	-1.912E 03	-3.364E 03	5.525E 03	5.709E 00	2.963E-03	0.000	0.000
8.163E 01	1.480E 00	0.000	2.162E 03	-5.291E 03	-1.927E 03	-3.364E 03	5.630E 03	3.806E 00	1.975E-03	0.000	0.000
8.444E 01	1.220E 00	0.000	2.192E 03	-5.305E 03	-1.941E 03	-3.364E 03	5.684E 03	3.137E 00	1.628E-03	0.000	0.000
8.730E 01	1.795E 00	0.000	2.228E 03	-5.328E 03	-1.964E 03	-3.364E 03	5.707E 03	4.616E 00	2.396E-03	0.000	0.000
8.731E 01	1.796E 00	0.000	2.228E 03	-5.328E 03	-1.964E 03	-3.364E 03	5.707E 03	4.619E 00	2.397E-03	0.000	0.000

READING = 0060 BLOCK = 159 TIME = 249.293 MACH 6.0 PT = 749.250 TT = 2986.6

X	DCRAG	CDRAG	CF	HC
4.040E 01	1.167E 02	1.167E 02	2.214E-03	4.379E-02
4.041E 01	1.759E-01	1.169E 02	2.215E-03	4.303E-02
4.132E 01	1.777E 01	1.346E 02	2.855E-03	4.656E-02
4.133E 01	1.972E-01	1.348E 02	2.499E-03	5.191E-02
4.139E 01	1.201E 00	1.360E 02	2.444E-03	5.337E-02
4.150E 01	1.910E 00	1.380E 02	2.451E-03	5.502E-02
4.246E 01	1.646E 01	1.544E 02	2.578E-03	7.111E-02
4.411E 01	2.478E 01	1.792E 02	2.911E-03	7.613E-02
4.431E 01	2.655E 00	1.818E 02	3.052E-03	7.207E-02
4.480E 01	6.655E 00	1.885E 02	3.059E-03	7.183E-02
4.483E 01	3.959E-01	1.889E 02	3.053E-03	7.192E-02
4.625E 01	1.926E 01	2.082E 02	3.315E-03	6.602E-02
4.626E 01	1.315E-01	2.083E 02	2.955E-03	7.561E-02
4.731E 01	1.262E 01	2.209E 02	2.895E-03	7.530E-02
4.735E 01	5.332E-01	2.214E 02	3.012E-03	7.204E-02
4.811E 01	8.922E 00	2.304E 02	2.981E-03	7.133E-02
4.879E 01	8.497E 00	2.389E 02	3.259E-03	6.188E-02
4.880E 01	1.277E-01	2.390E 02	2.969E-03	6.867E-02
4.933E 01	6.456E 00	2.454E 02	2.906E-03	6.550E-02
5.074E 01	1.653E 01	2.620E 02	2.856E-03	5.893E-02
5.284E 01	2.317E 01	2.851E 02	2.869E-03	4.713E-02
5.334E 01	5.485E 00	2.906E 02	2.967E-03	4.265E-02
5.409E 01	8.187E 00	2.988E 02	2.932E-03	4.045E-02
5.485E 01	8.027E 00	3.068E 02	2.928E-03	3.778E-02
5.576E 01	9.230E 00	3.161E 02	2.914E-03	3.594E-02
5.628E 01	3.206E 00	3.193E 02	2.905E-03	3.261E-02
5.633E 01	4.633E-01	3.197E 02	3.092E-03	2.623E-02
5.647E 01	1.212E 00	3.209E 02	2.893E-03	2.757E-02
5.655E 01	7.074E-01	3.217E 02	3.385E-03	2.820E-02
5.683E 01	2.467E 00	3.241E 02	3.084E-03	3.004E-02
5.706E 01	1.926E 00	3.260E 02	3.066E-03	2.904E-02
5.778E 01	6.340E 00	3.324E 02	2.990E-03	2.534E-02
5.880E 01	9.267E 00	3.417E 02	2.813E-03	1.747E-02
6.081E 01	1.590E 01	3.576E 02	2.612E-03	4.006E-02
6.223E 01	1.112E 01	3.687E 02	3.222E-03	3.028E-02
6.470E 01	2.015E 01	3.888E 02	3.168E-03	3.394E-02
6.507E 01	2.653E 00	3.915E 02	3.373E-03	3.111E-02
6.511E 01	2.770E-01	3.917E 02	3.479E-03	3.157E-02
6.531E 01	1.410E 00	3.932E 02	3.477E-03	3.146E-02
6.697E 01	1.201E 01	4.052E 02	3.411E-03	2.270E-02
6.764E 01	4.469E 00	4.096E 02	3.399E-03	2.038E-02
6.841E 01	4.688E 00	4.143E 02	3.364E-03	1.570E-02
6.913E 01	3.744E 00	4.181E 02	3.331E-03	1.272E-02
6.974E 01	2.772E 00	4.208E 02	3.305E-03	1.091E-02
7.069E 01	3.701E 00	4.245E 02	3.262E-03	8.523E-03
7.112E 01	1.474E 00	4.260E 02	3.246E-03	7.772E-03
7.265E 01	4.521E 00	4.305E 02	3.195E-03	5.852E-03
7.280E 01	3.643E-01	4.309E 02	3.182E-03	5.419E-03
7.355E 01	1.508E 00	4.324E 02	3.121E-03	3.799E-03
7.356E 01	2.470E-03	4.324E 02	3.121E-03	3.789E-03
7.488E 01	9.510E-01	4.334E 02	3.180E-03	5.756E-03
7.773E 01	2.393E 00	4.357E 02	3.215E-03	7.765E-03
8.163E 01	2.540E 00	4.383E 02	3.141E-03	5.670E-03
8.444E 01	1.088E 00	4.394E 02	3.103E-03	4.863E-03
8.730E 01	4.798E-01	4.399E 02	3.138E-03	6.507E-03
8.731E 01	0.000	4.399E 02	3.138E-03	6.510E-03

RAMJET PERFORMANCE

ENGINE PERFORMANCE

INLET

CALCULATED THRUST.....	1702. (LBF)	ANGLE OF ATTACK .....	0.000 (DEGREES)
MEASURED THRUST.....	1729. (LBF)	MASS FLOW RATIO.....	0.9842
CALCULATED SPECIFIC IMPULSE.....	2082. (LBF-SEC/LBM)	ADDITIONAL DRAG COEFFICIENT.....	0.0005
MEASURED SPECIFIC IMPULSE.....	2115. (LBF-SEC/LBM)	LIMITING PRESSURE RECOVERY EFFICIENCY.....	0.1616
CALCULATED THRUST COEFFICIENT.....	0.6797	DELTA P12.....	0.1189 (PSI)
MEASURED THRUST COEFFICIENT.....	0.6907	TOTAL PRESSURE RECOVERY - SUPERSONIC.....	0.3809
		TOTAL PRESSURE RECOVERY - SUBSONIC.....	0.1639
		INLET PROCESS EFFICIENCY - SUPERSONIC.....	0.8930
		INLET PROCESS EFFICIENCY - SUBSONIC.....	0.9047
		KINETIC ENERGY EFFICIENCY - SUPERSONIC.....	0.9368
		KINETIC ENERGY EFFICIENCY - SUBSONIC.....	0.8880
		ENTHALPY AT P0 - SUPERSONIC.....	-3.87 (BTU/LBM)
		ENTHALPY AT P0 - SUBSONIC.....	30.17 (BTU/LBM)

REGENERATIVE-COOLED ENGINE PERFORMANCE

CALCULATED

STREAM THRUST.....	6787. (LBF)
NET THRUST.....	1758. (LBF)
SPECIFIC IMPULSE.....	2151. (LBF-SEC/LBM)
THRUST COEFFICIENT.....	0.7024

MOMENTUM AND FORCES

COMBUSTOR

INLET FRICTION DRAG.....	116.7 (LBF)	FUEL-AIR RATIO.....	0.0305
INLET MOMENTUM CHANGE.....	-751.4 (LBF)	EQUIVALENCE RATIO.....	0.916
COMBUSTOR FRICTION DRAG.....	274.8 (LBF)	COMBUSTOR EFFICIENCY.....	0.978
COMBUSTOR STRUT DRAG.....	-2.50 (LBF)	TOTAL PRESSURE RATIO.....	0.1521
COMBUSTOR MOMENTUM CHANGE.....	1218. (LBF)	COMBUSTOR EFFECTIVENESS.....	0.8604
NOZZLE FRICTION DRAG.....	48.39 (LBF)	INJECTOR DISCHARGE COEFFICIENTS	0.7426, 0.7802, 0.6822
NOZZLE STRUT DRAG.....	-0.00 (LBF)		
NOZZLE MOMENTUM CHANGE.....	1235. (LBF)		
NOZZLE PRESSURE INTEGRAL.....	1283. (LBF)		
EXTERNAL FRICTION DRAG.....	61.72 (LBF)		
EXTERNAL PRESSURE INTEGRAL.....	-1351. (LBF)		
TOTAL EXTERNAL DRAG.....	-1413. (LBF)		
TOTAL STRUT DRAG.....	-2.50 (LBF)		
CAVITY FORCE.....	-1359. (LBF)		
CALCULATED LOAD CELL FORCE.....	-1070. (LBF)		
MEASURED LOAD CELL FORCE.....	-1042. (LBF)		
FUEL VACUUM SPECIFIC IMPULSE	0.0, -169.0, -127.0,		

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS.....	0.9252
NOZZLE COEFFICIENT - CT.....	0.8366
PROCESS EFFICIENCY.....	0.8017
KINETIC ENERGY EFFICIENCY.....	0.8294

STATIONS

NOMINAL COWL LEADING EDGE.....	34.884 (IN)
SPIKE TRANSLATION.....	0.3340 (IN)
INLET THROAT.....	40.400 (IN)
COWL LEADING EDGE.....	35.219 (IN)
NOZZLE SHROUD TRAILING EDGE.....	73.559 (IN)
NOZZLE PLUG TRAILING EDGE.....	87.311 (IN)
STRUT LEADING EDGE.....	56.475 (IN)
STRUT TRAILING EDGE.....	65.075 (IN)
COMBUSTOR EXIT.....	65.075 (IN)

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.320	B
1C	44.300	
2A	48.795	D
2C	46.250	E
3A	54.085	
3B	56.270	
4	44.820	

Reading 60

$t = 258.29 \text{ sec.}$

READING = 0050 BLUCK # 169 TIME = 256.293 MACH 6.0 PI = 744.244 TI = 2984.7  
WINDJET PERFORMANCE

1-29-75  
Reg. com.

S U M M A R Y R E P O R T

	P	T	U	S	GAP	COL	SON	NALM	VEL	S	A/A	N	A/AC	PCWIM	G	IVAC	PHI	ETAC
WIND TUNNEL	1	5																
0.000	149.239	2985	664.01	7901	1.2932	28.966	2574											
0.000	0.369	404	631.91	471	1.3569	28.965	985	5.945	5905	1.825	0.10646	26.787	0.9824	5014	9.769	187.2		
SPIKE TIP NS	2	4																
0.000	18.075	2985	664.01	7901	1.2931	28.965	2574											
0.000	18.324	2917	644.21	7701	1.2953	28.965	2546	0.348	1014	2.081	0.10646	26.787	0.9824	4953	1.678	184.9		
WIND TUNNEL	3	0																
0.000	749.249	2985	664.01	7901	1.2932	28.966	2574											
0.000	0.360	401	632.51	961	1.3588	28.965	982	6.016	5907	1.825	0.10489	26.390	0.9824	4941	9.629	187.2		
SPIKE TIP NS	4	0																
0.000	18.075	2985	664.01	7901	1.2931	28.965	2574											
0.000	18.368	2919	645.01	7711	1.2952	28.965	2547	0.391	997	2.081	0.10489	26.390	0.9824	4941	1.624	187.2		
INLET THROAT	5	3																
40.400	290.357	2913	643.21	7691	1.2955	28.966	2545											
40.400	15.804	1431	623.81	3531	1.3518	28.965	1822	2.515	4981	1.883	0.94869	26.787	0.1102	4261	67.545	154.1		
INLET UPBARK	6	3																
40.400	290.357	2913	643.21	7691	1.2955	28.966	2545											
40.400	13.573	1375	609.11	3381	1.3551	28.965	1788	2.606	4661	1.883	0.86245	26.787	0.1213	4302	62.467	160.6		
INLET DOWNBARK	7	4																
40.400	123.101	2913	643.21	7691	1.2955	28.966	2545											
40.400	105.676	2913	613.21	7401	1.2986	28.966	2504	0.489	1225	1.942	0.86245	26.787	0.1213	4302	16.416	160.6		
COMBUSTOR	8	1																
40.410	289.755	2913	643.21	7691	1.2955	28.966	2545											
40.410	15.821	1432	624.01	3531	1.3518	28.965	1823	2.513	4580	1.883	0.94858	26.787	0.1103	4260	67.511	159.0		
COMBUSTOR	9	2																
41.358	232.210	2905	640.61	7661	1.2957	28.966	2542											
41.358	18.158	1566	659.61	3681	1.3443	28.965	1901	2.297	4366	1.898	0.94918	26.787	0.1102	4148	64.407	154.8		
COMBUSTOR	10	3																
41.423	228.730	2904	640.41	7661	1.2958	28.966	2541											
41.423	18.348	1575	626.31	3911	1.3438	28.965	1906	2.282	4350	1.899	0.94957	26.787	0.1101	4139	64.192	154.5		
COMBUSTOR	11	4																
41.500	224.594	2903	640.21	7661	1.2958	28.966	2541											
41.500	18.580	1587	625.51	3941	1.3432	28.965	1913	2.263	4330	1.900	0.94996	26.787	0.1101	4129	63.923	154.1		
COMBUSTOR	12	5																
42.460	197.083	2890	636.41	7621	1.2962	28.966	2536											
42.460	19.882	1660	625.11	4141	1.3396	28.965	1954	2.146	4192	1.907	0.94106	26.787	0.1111	4057	61.314	151.4		
COMBUSTOR	13	6																
44.143	179.461	2863	626.81	7551	1.2970	28.966	2526											
44.143	19.793	1683	629.31	4201	1.3385	28.965	1966	2.090	4110	1.911	0.90592	26.787	0.1154	4007	57.857	149.6		
COMBUSTOR	14	7																
44.310	178.066	2862	628.01	7541	1.2971	28.966	2524											
44.310	19.872	1686	629.21	4211	1.3363	28.965	1968	2.063	4099	1.911	0.90548	26.787	0.1155	4001	57.684	149.4		
COMBUSTOR	15	8																
44.800	175.316	2854	625.51	7521	1.2973	28.966	2521											
44.800	19.914	1688	629.71	4221	1.3362	28.965	1969	2.072	4080	1.912	0.90214	26.787	0.1159	3989	57.206	148.9		
COMBUSTOR	16	9																
44.858	175.183	2853	625.11	7511	1.2974	28.966	2520											
44.858	19.899	1688	629.51	4211	1.3363	28.965	1969	2.072	4080	1.912	0.90165	26.787	0.1160	3988	57.164	148.9		
COMBUSTOR	17	10																
46.250	111.432	2879	647.61	8611	1.2990	25.425	2704											
46.250	32.194	2144	605.21	6221	1.3238	25.425	2356	1.478	3482	2.167	0.86039	27.089	0.1229	3946	46.560	145.6	0.34	0.12
COMBUSTOR	18	11																
46.260	111.241	2883	647.51	8631	1.2988	25.429	2706											
46.260	32.293	2149	605.71	6231	1.3236	25.429	2358	1.475	3478	2.166	0.85999	27.089	0.1230	3946	46.487	145.7	0.34	0.12

READING = 0040 HLOC = 109 TIME = 250.243 HLM = 0.0 PI = 749.244 FI = 290.17

	P	I	M	S	GAMA	DEL-T	SUNV	NALM	VFL	S	A	AAC	MUTIM	L	IVAL	PHI	ETAC
COMBUSTOR	0	19	12	5													
47-310	95.060	3253	640.5( 980)	1.2009	25.030	2032											
47-310	02.719	2714	455.9( 800)	1.2993	25.040	2005											
COMBUSTOR	0	20	13	3													
47-303	95.103	3272	640.0( 966)	1.2800	25.054	2038											
47-303	43.372	2713	458.9( 810)	1.2980	25.061	2017											
COMBUSTOR	0	21	14	4													
48-110	89.966	3422	635.2(1034)	1.2722	26.030	2083											
48-110	43.760	2922	461.0( 866)	1.2897	26.042	2082											
COMBUSTOR	0	22	15	11													
48-823	87.569	2701	650.3( 949)	1.3057	22.101	2058											
48-823	30.551	2159	423.5( 718)	1.3271	22.101	2039											
COMBUSTOR	0	23	16	2													
48-833	87.531	2702	650.3( 949)	1.3057	22.102	2058											
48-833	30.476	2159	423.0( 717)	1.3271	22.102	2039											
COMBUSTOR	0	24	17	3													
49-303	86.003	2811	653.1( 959)	1.3003	22.134	2069											
49-303	26.403	2117	393.8( 702)	1.3282	22.134	2013											
COMBUSTOR	0	25	18	5													
50-773	70.712	3037	644.7(1187)	1.2736	22.727	3095											
50-773	36.775	2977	461.6(1010)	1.2900	22.730	2080											
COMBUSTOR	0	26	19	5													
52-873	64.907	3012	633.3(1325)	1.2521	23.123	3203											
52-873	24.707	3113	347.3(1055)	1.2793	23.139	2026											
COMBUSTOR	0	27	20	3													
53-373	64.087	3053	630.6(1341)	1.2494	23.172	3214											
53-373	22.854	3108	324.0(1051)	1.2700	23.190	2010											
COMBUSTOR	0	28	21	4													
54-123	62.413	3931	627.1(1369)	1.2444	23.261	3233											
54-123	20.909	3158	297.9(1061)	1.2764	23.284	2024											
COMBUSTOR	0	29	22	4													
54-803	61.294	3976	623.5(1366)	1.2413	23.317	3244											
54-803	18.937	3125	289.2(1055)	1.2760	23.344	2014											
COMBUSTOR	0	30	23	4													
55-700	59.520	4032	619.4(1414)	1.2360	23.406	3261											
55-700	17.509	3163	289.9(1067)	1.2732	23.440	2023											
COMBUSTOR	0	31	24	5													
56-308	47.722	4505	617.0(1399)	1.1973	23.951	3361											
56-308	16.616	3708	253.4(1297)	1.2349	24.071	3109											
COMBUSTOR	0	32	25	5													
56-303	53.206	4103	616.6(1463)	1.2259	23.553	3290											
56-303	12.801	3155	177.7(1061)	1.2711	23.600	2006											
COMBUSTOR	0	33	26	3													
56-503	53.083	4193	616.3(1467)	1.2252	23.565	3292											
56-503	12.687	3160	174.6(1063)	1.2707	23.619	2007											
COMBUSTOR	0	34	27	6													
56-503	40.533	4534	616.0(1575)	1.1983	23.941	3359											
56-503	16.164	3704	239.5(1280)	1.2375	24.061	3094											
COMBUSTOR	0	35	28	3													
56-803	49.008	4525	614.8(1591)	1.1992	23.934	3357											
56-803	15.712	3705	226.0(1265)	1.2398	24.052	3081											
COMBUSTOR	0	36	29	4													
57-089	50.892	4423	614.0(1553)	1.2075	23.823	3339											
57-089	14.400	3510	190.5(1192)	1.2515	23.918	3022											
COMBUSTOR	0	37	30	5													
57-813	60.820	3906	611.2(1393)	1.2395	23.369	3246											
57-813	10.362	2700	100.6( 916)	1.2860	23.400	2749											

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0060 BLOCK = 169 TIME = 258.293 MACH 0.0 PT = 749.249 TI = 2984.7

	P	I	M	GAMMA	MOL-F	SONV	MACH	VEL	S	r/A	n	A/AC	MUMIN	U	IVAL	PHI	LTAC
COMBUSTOR	0	30	31	7													
58.833	101.975	3307	607.5(1152)	1.2774	22.729	3058											
58.833	6.000	1717	-2.3( 550)	1.5306	22.732	2241	2.465	5524	2.459	0.28388	27.461	0.3177	5245	24.564	192.2	0.76	0.31
COMBUSTOR	0	39	32	7													
60.843	47.357	4848	600.4(1713)	1.1724	24.340	3407											
60.843	19.275	4252	267.9(1470)	1.1989	24.553	3213	1.270	4079	2.597	0.29376	27.461	0.3650	5263	18.620	192.4	0.76	0.87
COMBUSTOR	0	40	35	5													
62.263	52.451	4498	595.2(1580)	1.2016	23.954	3349											
62.263	15.494	3619	186.0(1231)	1.2444	24.067	3050	1.464	4525	2.577	0.30172	27.461	0.3553	5272	21.216	192.0	0.76	0.71
COMBUSTOR	0	41	34	5													
64.727	44.834	4929	585.5(1742)	1.1645	24.473	3415											
64.727	20.959	4407	297.4(1545)	1.1832	24.699	3555	1.167	3797	2.600	0.28600	27.461	0.3744	5253	16.076	191.3	0.76	0.94
COMBUSTOR	0	42	35	4													
65.103	41.267	4989	583.9(1765)	1.1583	24.546	3421											
65.103	21.171	4504	326.3(1598)	1.1716	24.779	3283	1.094	3590	2.606	0.26586	27.461	0.4032	5251	14.834	191.2	0.76	0.98
COMBUSTOR	0	43	36	21													
65.103	41.267	5049	633.4(1790)	1.1554	24.482	3442											
65.103	22.804	4695	399.7(1644)	1.1654	24.706	3318	1.031	3420	2.616	0.26988	27.461	0.4032	5274	14.129	192.0	0.76	0.98
NOZZLE	AE	44	37	5													
87.339	41.267	4489	583.9(1740)	1.1583	24.546	3421											
87.339	1.303	2801	-491.6( 903)	1.2670	25.068	2553	2.765	7336	2.606	0.05535	27.461	1.9371	6908	6.310	251.5	0.76	0.98
VOZZLE	PU	45	38	5													
87.339	41.267	4989	583.9(1740)	1.1583	24.546	3421											
87.339	0.389	2150	-728.0( 668)	1.2917	25.070	2347	3.452	8102	2.606	0.02375	27.461	4.5139	7365	2.991	268.2	0.76	0.98
VOZZLE	AE	46	39	5													
87.339	41.267	5049	633.4(1790)	1.1554	24.482	3442											
87.339	1.334	2869	-456.3( 935)	1.2634	25.067	2690	2.747	7391	2.616	0.05535	27.461	1.9371	6970	6.357	253.8	0.76	0.98
VOZZLE	PU	47	40	5													
87.339	41.267	5049	633.4(1790)	1.1554	24.482	3442											
87.339	0.389	2211	-706.5( 669)	1.2893	25.070	2378	3.444	8188	2.616	0.02334	27.461	4.5932	7446	2.970	271.1	0.76	0.98
VOZZLE	COMBUSTOR	67	60	0													
15.103	290.357	5208	583.9(1849)	1.1763	24.797	3505											
15.103	0.389	1869	-1019.8( 406)	1.3311	25.148	1698	4.714	8947	2.448	0.04133	27.461	2.5940	7895	5.747	287.5	0.76	1.00
VOZZLE	NOZZLE	68	61	0													
17.339	23.882	4901	559.2(1730)	1.1541	24.512	3387											
17.339	1.694	3270	-508.2(1079)	1.2446	25.056	2842	2.318	6588	2.646	0.05535	27.461	1.9371	6464	5.667	235.4	0.76	0.98

XARS	P-18	P-OB	PDA	UQA	W-18	9-OB	CAM-ALL	P-18/P80	P-OB/P80	P-18/P10	P-OB/P10
6.90E-01	1.070E 00	0.000	-3.404E-01	0.000	0.000	0.000	2.470E-02	2.754E 00	0.000	1.428E-03	0.000
1.854E 01	1.070E 01	0.000	-3.562E 01	0.000	0.000	0.000	1.635E 02	2.754E 00	0.000	1.428E-03	0.000
3.070E 01	2.240E 00	0.000	-1.608E 02	0.000	0.000	0.000	5.052E 02	5.765E 00	0.000	2.990E-03	0.000
3.506E 01	3.927E 00	0.000	-3.696E 02	0.000	0.000	0.000	6.805E 02	1.011E 01	0.000	5.242E-03	0.000
3.524E 01	3.967E 00	0.000	-4.396E 02	0.000	0.000	0.000	6.875E 02	1.030E 01	0.000	5.242E-03	0.000
3.585E 01	3.964E 00	0.000	-4.396E 02	0.000	0.000	0.000	6.875E 02	1.030E 01	0.000	5.242E-03	0.000
3.555E 01	4.030E 00	0.000	-4.403E 02	0.000	0.000	0.000	7.182E 02	1.037E 01	0.000	5.242E-03	0.000
3.506E 01	3.940E 00	0.000	-4.723E 02	0.000	0.000	0.000	7.551E 02	1.031E 01	0.000	5.242E-03	0.000
3.701E 01	4.250E 00	0.000	-4.933E 02	0.000	0.000	0.000	8.131E 02	1.094E 01	0.000	5.672E-03	0.000
3.737E 01	4.232E 00	0.000	-5.330E 02	0.000	0.000	0.000	9.087E 02	1.089E 01	0.000	5.649E-03	0.000
3.803E 01	4.200E 00	0.000	-5.500E 02	0.000	0.000	0.000	9.805E 02	1.081E 01	0.000	5.606E-03	0.000
3.839E 01	4.125E 00	0.000	-5.519E 02	0.000	0.000	0.000	1.021E 03	1.057E 01	0.000	5.674E-03	0.000
3.875E 01	4.020E 00	0.000	-5.555E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
3.866E 01	4.020E 00	0.000	-5.555E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
3.901E 01	4.019E 00	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
3.937E 01	4.150E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
3.966E 01	4.174E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.006E 01	4.267E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.036E 01	4.267E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.091E 01	4.116E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.112E 01	4.047E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.150E 01	4.011E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.204E 01	4.262E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.246E 01	4.168E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.246E 01	4.168E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.310E 01	4.172E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.370E 01	4.183E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.406E 01	4.189E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.465E 01	4.339E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.465E 01	4.339E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0.000
4.731E 01	4.472E 01	0.000	-5.574E 02	0.000	0.000	0.000	1.081E 03	1.081E 01	0.000	5.674E-03	0



LEADING = 0060 BLOCK = 109 TIME = 258.293 MACM 0.0 PI = 740.249 TI = 284.7  
 PAGE 5

LAB	P-ID	P-CH	P-NA	WUX	W-TH	G-OB	CANALL	P-ID/MSU	P-16/P10	P-UB/MSU	P-UB/P10
6.473E 01	2.096E 01	2.096E 01	7.303E 02	-3.096E 03	-1.661E 03	-2.035E 03	4.289E 03	5.394E 01	2.797E-02	5.394E 01	2.797E-02
6.510E 01	2.052E 01	2.052E 01	7.303E 02	-3.741E 03	-1.661E 03	-2.040E 03	4.337E 03	5.288E 01	2.743E-02	5.608E 01	2.743E-02
6.514E 01	2.055E 01	2.186E 01	7.303E 02	-3.740E 03	-1.663E 03	-2.062E 03	4.342E 03	5.286E 01	2.743E-02	5.651E 01	2.909E-02
6.534E 01	1.961E 01	2.232E 01	7.303E 02	-3.709E 03	-1.664E 03	-2.075E 03	4.364E 03	5.045E 01	2.617E-02	5.745E 01	2.960E-02
6.700E 01	1.177E 01	4.240E 00	9.055E 02	-3.931E 03	-1.768E 03	-2.163E 03	4.563E 03	3.029E 01	1.571E-02	2.378E 01	1.233E-02
6.767E 01	8.408E 00	6.835E 00	1.099E 03	-3.961E 03	-1.790E 03	-2.191E 03	4.665E 03	2.163E 01	1.122E-02	2.274E 01	1.179E-02
6.844E 01	4.540E 00	6.822E 00	1.296E 03	-4.034E 03	-1.812E 03	-2.222E 03	4.760E 03	1.168E 01	6.059E-03	1.755E 01	9.105E-03
6.916E 01	3.528E 00	4.940E 00	1.422E 03	-4.061E 03	-1.828E 03	-2.254E 03	4.846E 03	9.076E 00	4.708E-03	1.271E 01	6.593E-03
6.977E 01	2.678E 00	4.163E 00	1.504E 03	-4.114E 03	-1.839E 03	-2.280E 03	4.922E 03	6.871E 00	3.564E-03	1.077E 01	5.586E-03
7.072E 01	1.920E 00	3.010E 00	1.596E 03	-4.142E 03	-1.852E 03	-2.320E 03	5.036E 03	4.940E 00	2.562E-03	7.746E 00	4.017E-03
7.115E 01	1.580E 00	2.772E 00	1.628E 03	-4.145E 03	-1.857E 03	-2.338E 03	5.088E 03	4.066E 00	2.109E-03	7.133E 00	3.700E-03
7.268E 01	1.062E 00	1.925E 00	1.712E 03	-4.250E 03	-1.873E 03	-2.377E 03	5.273E 03	2.742E 00	1.422E-03	4.954E 00	2.569E-03
7.283E 01	1.015E 00	1.699E 00	1.714E 03	-4.254E 03	-1.875E 03	-2.380E 03	5.290E 03	2.612E 00	1.355E-03	4.347E 00	2.254E-03
7.358E 01	1.043E 00	5.100E-01	1.755E 03	-4.276E 03	-1.881E 03	-2.347E 03	5.374E 03	2.612E 00	1.459E-03	1.312E 00	6.807E-04
7.359E 01	1.043E 00	5.037E-01	1.756E 03	-4.276E 03	-1.881E 03	-2.347E 03	5.375E 03	2.613E 00	1.459E-03	1.296E 00	6.723E-04
7.491E 01	1.230E 00	0.000	1.781E 03	-4.323E 03	-1.892E 03	-2.431E 03	5.426E 03	3.165E 00	1.642E-03	0.000	0.000
7.776E 01	2.150E 00	0.000	1.848E 03	-4.345E 03	-1.912E 03	-2.431E 03	5.525E 03	5.533E 00	2.870E-03	0.000	0.000
8.166E 01	1.475E 00	0.000	1.926E 03	-4.365E 03	-1.934E 03	-2.431E 03	5.630E 03	3.796E 00	1.969E-03	0.000	0.000
8.447E 01	1.165E 00	0.000	1.955E 03	-4.364E 03	-1.953E 03	-2.431E 03	5.684E 03	2.998E 00	1.555E-03	0.000	0.000
8.733E 01	1.715E 00	0.000	1.990E 03	-4.418E 03	-1.986E 03	-2.431E 03	5.707E 03	4.413E 00	2.289E-03	0.000	0.000
8.734E 01	1.716E 00	0.000	1.990E 03	-4.418E 03	-1.986E 03	-2.431E 03	5.707E 03	4.416E 00	2.291E-03	0.000	0.000

ORIGINAL PAGE IS  
 OF POOR QUALITY

ORIGINAL PAGE IS  
OF POOR QUALITY

READING = 0000 CLICK = 109 TIME = 254.243 MAGN 5.0 PLE /44.244 TI = 254.47

X	WRAU	CURAG	CF	HL
4.040E 01	1.175E 02	1.175E 02	2.212E+03	4.377E+02
4.041E 01	1.764E+01	1.177E 02	2.213E+03	4.378E+02
4.136E 01	1.680E 01	1.345E 02	2.332E+03	4.693E+02
4.142E 01	1.162E 00	1.357E 02	2.340E+03	4.716E+02
4.150E 01	1.388E 00	1.371E 02	2.351E+03	4.745E+02
4.246E 01	1.712E 01	1.542E 02	2.411E+03	4.860E+02
4.414E 01	2.944E 01	1.836E 02	2.441E+03	4.751E+02
4.431E 01	2.864E 00	1.865E 02	2.443E+03	4.754E+02
4.480E 01	8.387E 00	1.949E 02	2.441E+03	4.738E+02
4.486E 01	9.840E+01	1.959E 02	2.441E+03	4.733E+02
4.625E 01	2.451E 01	2.204E 02	3.084E+03	5.535E+02
4.626E 01	1.694E+01	2.205E 02	2.759E+03	6.219E+02
4.731E 01	1.527E 01	2.358E 02	2.808E+03	6.872E+02
4.738E 01	9.933E+01	2.368E 02	2.993E+03	6.427E+02
4.811E 01	9.674E 00	2.465E 02	2.990E+03	6.297E+02
4.882E 01	1.002E 01	2.565E 02	3.354E+03	4.868E+02
4.893E 01	1.413E+01	2.566E 02	2.803E+03	5.938E+02
4.936E 01	6.712E 00	2.633E 02	2.748E+03	5.903E+02
5.077E 01	1.527E 01	2.786E 02	2.801E+03	5.988E+02
5.287E 01	1.982E 01	2.984E 02	3.021E+03	4.614E+02
5.337E 01	4.970E 00	3.034E 02	3.021E+03	4.165E+02
5.412E 01	7.503E 00	3.104E 02	3.000E+03	5.937E+02
5.488E 01	7.432E 00	3.163E 02	2.997E+03	3.677E+02
5.576E 01	8.360E 00	3.267E 02	2.983E+03	3.477E+02
5.631E 01	3.135E 00	3.298E 02	2.963E+03	3.135E+02
5.632E 01	4.351E+01	3.303E 02	3.139E+03	2.562E+02
5.650E 01	1.146E 00	3.314E 02	2.967E+03	2.678E+02
5.658E 01	6.592E+01	3.321E 02	3.353E+03	2.739E+02
5.686E 01	2.290E 00	3.344E 02	3.130E+03	2.874E+02
5.709E 01	1.620E 00	3.362E 02	3.107E+03	2.761E+02
5.761E 01	6.080E 00	3.423E 02	3.016E+03	2.307E+02
5.883E 01	4.626E 00	3.511E 02	2.770E+03	1.696E+02
6.084E 01	1.498E 01	3.661E 02	2.635E+03	1.706E+02
6.226E 01	1.060E 01	3.767E 02	3.207E+03	2.775E+02
6.473E 01	1.912E 01	3.958E 02	3.144E+03	3.197E+02
6.510E 01	2.487E 00	3.983E 02	3.360E+03	2.905E+02
6.514E 01	2.595E+01	3.985E 02	3.459E+03	2.950E+02
6.534E 01	1.319E 00	3.999E 02	3.457E+03	2.942E+02
6.700E 01	1.137E 01	4.112E 02	3.360E+03	2.179E+02
6.767E 01	4.280E 00	4.155E 02	3.337E+03	1.941E+02
6.844E 01	4.486E 00	4.200E 02	3.285E+03	1.485E+02
6.916E 01	3.592E 00	4.236E 02	3.245E+03	1.213E+02
6.977E 01	2.675E 00	4.263E 02	3.217E+03	1.044E+02
7.072E 01	3.587E 00	4.298E 02	3.171E+03	8.202E+01
7.119E 01	4.433E 00	4.313E 02	3.155E+03	7.481E+03
7.268E 01	4.988E 00	4.357E 02	3.103E+03	5.631E+03
7.283E 01	3.545E+01	4.460E 02	3.089E+03	5.210E+03
7.358E 01	1.441E 00	4.375E 02	3.018E+03	3.474E+03
7.359E 01	2.303E+03	4.375E 02	3.017E+03	3.464E+03
7.491E 01	8.527E+01	4.383E 02	3.065E+03	4.830E+03
7.776E 01	2.197E 00	4.405E 02	3.121E+03	7.330E+03
8.166E 01	2.453E 00	4.430E 02	3.052E+03	5.480E+03
8.447E 01	1.049E 00	4.444E 02	3.007E+03	4.552E+03
8.733E 01	4.563E+01	4.445E 02	3.044E+03	8.086E+03
8.734E 01	0.000	4.445E 02	3.044E+03	6.086E+03

READING # 0000 BLANK # 100 TYPE # 250.293 LCM 0.0 PT # 740.240 TI # 2404.7

WINGJET PERFORMANCE

ENGINE PERFORMANCE

CALCULATED THRUST..... 1447. (LBF)  
 MEASURED THRUST..... 1530. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 2146. (LBF-SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2270. (LBF-SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5782  
 MEASURED THRUST COEFFICIENT..... 0.6114

REGENERATIVE-COOLED ENGINE PERFORMANCE

STREAM THRUST..... 6522. (LBF)  
 NET THRUST..... 1505. (LBF)  
 SPECIFIC IMPULSE..... 2233. (LBF-SEC/LBM)  
 THRUST COEFFICIENT..... 0.6019

MOMENTUM AND FORCES

INLET FRICTION DRAG..... 117.5 (LBF)  
 INLET MOMENTUM CHANGE..... -756.6 (LBF)  
 COMBUSTOR FRICTION DRAG..... 280.7 (LBF)  
 COMBUSTOR STRUT DRAG..... 0.16 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 990. (LBF)  
 NOZZLE FRICTION DRAG..... 46.21 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1213. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1259. (LBF)  
 EXTERNAL FRICTION DRAG..... 56.27 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1235. (LBF)  
 TOTAL EXTERNAL DRAG..... -1291. (LBF)  
 TOTAL STRUT DRAG..... 0.16 (LBF)  
 CAVITY FORCE..... -1263. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1127. (LBF)  
 MEASURED LOAD CELL FORCE..... -1044. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE -170.5, -125.0

STATIONS

NORMAL CONFL LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.3627 (IN)  
 INLET THROAT..... 40.400 (IN)  
 CONFL LEADING EDGE..... 39.247 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.587 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.339 (IN)  
 STRUT LEADING EDGE..... 56.503 (IN)  
 STRUT TRAILING EDGE..... 65.103 (IN)  
 COMBUSTOR EXIT..... 65.103 (IN)

INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW MAJID..... 0.9824  
 ADDITIVE DRAG COEFFICIENT..... 0.0006  
 LIMITING PRESSURE RECOVERY EFFICIENCY..... 0.1620  
 DELTA PT2..... 0.1106 (PSI)  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3875  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1643  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8970  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9061  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9312  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8820  
 ENTHALPY AT P0 - SUPERSONIC..... -5.58 (BTU/LBM)  
 ENTHALPY AT P0 - SUBSONIC..... 28.66 (BTU/LBM)

COMBUSTOR

FUEL-AIR RATIO..... 0.0252  
 EQUIVALENCE RATIO..... 0.757  
 COMBUSTOR EFFICIENCY..... 0.980  
 TOTAL PRESSURE RATIO..... 0.1422  
 COMBUSTOR EFFECTIVENESS..... 0.8501  
 INJECTOR DISCHARGE COEFFICIENTS 0.7798, 0.6720

NOZZLE

VACUUM STREAM THRUST COEFFICIENT - CS..... 0.9357  
 NOZZLE COEFFICIENT - CT..... 0.8513  
 PROCESS EFFICIENCY..... 0.8372  
 KINETIC ENERGY EFFICIENCY..... 0.8502

FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.348	
1C	44.300	
2A	48.823	D
2C	46.250	E
3A	54.113	
3B	56.298	
J	44.846	

Reading 60

$t = 264.59 \text{ sec.}$

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WIND TUNNEL	P	I	M	GAMMA	MOLNI	SUNV	MACM	VFL	S	V/A	A	A/C	POPUP	Q	IVAC	PHI	ETAC
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
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0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	187.5
0.000	740.499	2442	0.000	667.00	7921	1.2930	28.966	2577	0.391	998	2.082	0.10459	28.302	0.9818	4931	1.622	1

HEADING = 0000 BLOCK = 170 TIME = 204.545 BACH 6.0 PI = 108.404 TI = 2041.9

COMBUSTOR	P	T	F	GAMMA	MELT	QUAN	WALM	VEL	S	W/A	W	A/VAC	MUMTK	U	IVAC	PHI	ETAC
47.310	95.109	3305	0 19	5	642.9( 996)	1.2785	25.901	2848									
47.310	44.903	2794	0 20	13	467.2( 826)	1.2960	25.904	2636	1.125	2966	2.210	0.79087	27.053	0.1322	4014	36.819	148.4 0.34 0.38
47.363	94.831	3322	0 21	4	642.4(1002)	1.2776	25.921	2853									
47.363	45.592	2823	0 21	14	470.2( 835)	1.2948	25.924	2648	1.109	2936	2.212	0.79536	27.053	0.1328	4019	36.284	148.6 0.34 0.39
48.110	90.052	3473	0 22	15	637.6(1050)	1.2697	26.102	2898									
48.110	45.554	2995	0 22	15	470.0( 889)	1.2866	26.107	2709	1.069	2895	2.224	0.74409	27.053	0.1419	4091	33.480	151.2 0.34 0.49
48.823	87.440	2775	0 23	16	662.1( 957)	1.3064	21.832	2873									
48.823	31.072	2163	0 23	16	430.6( 728)	1.3274	21.832	2557	1.331	3404	2.450	0.69080	27.460	0.1552	4140	36.539	150.8 0.80 0.10
48.833	87.409	2775	0 24	17	662.1( 957)	1.3063	21.833	2873									
48.833	30.983	2162	0 24	17	430.0( 727)	1.3274	21.833	2556	1.333	3408	2.450	0.68990	27.460	0.1554	4142	36.534	150.8 0.80 0.10
49.363	86.633	2785	0 25	18	658.8( 961)	1.3058	21.848	2877									
49.363	26.271	2088	0 25	18	395.9( 700)	1.3299	21.848	2514	1.443	3627	2.491	0.64522	27.460	0.1662	4214	36.371	153.5 0.80 0.10
50.773	70.896	3420	0 26	19	650.5(1193)	1.2748	22.439	3108									
50.773	37.512	2973	0 26	19	470.5(1021)	1.2907	22.443	2916	1.029	3001	2.524	0.58491	27.460	0.1950	4434	25.645	161.5 0.80 0.29
52.673	64.865	3526	0 27	20	639.0(1346)	1.2516	22.862	3227									
52.673	25.500	3148	0 27	20	356.6(1079)	1.2782	22.877	2957	1.271	3759	2.557	0.45071	27.460	0.2379	4762	26.328	173.4 0.80 0.42
53.373	63.932	3873	0 28	21	636.4(1364)	1.2486	23.915	3239									
53.373	23.517	3146	0 28	21	332.8(1078)	1.2774	23.933	2952	1.320	3898	2.561	0.43229	27.460	0.2480	4820	26.183	175.5 0.80 0.44
54.123	62.311	3953	0 29	22	632.7(1393)	1.2433	23.005	3259									
54.123	21.466	3176	0 29	22	305.5(1087)	1.2750	23.029	2957	1.369	4046	2.567	0.40749	27.460	0.2631	4900	25.624	178.4 0.80 0.47
54.883	61.223	3998	0 30	23	629.1(1410)	1.2402	23.060	3270									
54.883	19.387	3162	0 30	23	275.4(1081)	1.2746	23.089	2946	1.428	4206	2.570	0.38534	27.460	0.2782	4972	25.190	181.0 0.80 0.49
55.760	59.695	4075	0 31	24	625.0(1439)	1.2348	23.150	3287									
55.760	17.992	3199	0 31	24	251.1(1093)	1.2718	23.185	2954	1.464	4325	2.576	0.36295	27.460	0.2954	5045	24.397	183.7 0.80 0.51
56.308	47.845	4571	0 32	25	622.6(1628)	1.1955	23.692	3387									
56.308	16.958	3629	0 32	25	258.3(1327)	1.2326	23.617	3139	1.360	4270	2.616	0.29143	27.460	0.3679	5242	19.337	190.9 0.80 0.70
56.363	53.144	4213	0 33	26	622.4(1491)	1.2242	23.302	3317									
56.363	13.082	3197	0 33	26	181.3(1069)	1.2693	23.358	2939	1.598	4696	2.592	0.29056	27.460	0.3690	5246	21.215	191.0 0.80 0.56
56.503	52.998	4223	0 34	27	621.8(1495)	1.2234	23.314	3319									
56.503	12.963	3203	0 34	27	178.0(1091)	1.2689	23.371	2940	1.603	4712	2.593	0.28847	27.460	0.3717	5256	21.126	191.4 0.80 0.57
56.583	48.655	4560	0 35	28	621.5(1623)	1.1966	23.643	3385									
56.583	16.490	3785	0 35	28	243.9(1310)	1.2352	23.807	3125	1.391	4347	2.614	0.29181	27.460	0.3674	5262	19.714	191.6 0.80 0.70
56.863	49.224	4551	0 36	29	620.4(1620)	1.1975	23.674	3383									
56.863	16.012	3744	0 36	29	230.7(1294)	1.2376	23.797	3111	1.419	4416	2.613	0.29084	27.460	0.3686	5281	19.960	192.3 0.80 0.70
57.089	51.027	4447	0 37	30	619.5(1580)	1.2061	23.562	3364									
57.089	14.683	3543	0 37	30	201.2(1218)	1.2499	23.661	3051	1.500	4575	2.606	0.29029	27.460	0.3693	5294	20.641	192.8 0.80 0.65
57.813	61.491	4004	0 38	31	616.7(1412)	1.2395	23.096	3268									
57.813	10.425	2764	0 38	31	104.9( 928)	1.2867	23.127	2767	1.829	5061	2.569	0.28549	27.460	0.3753	5322	22.470	193.8 0.80 0.50

ORIGINAL PAGE IS  
DE POOR QUALITY

READING = 0060 BLUCK = 176 TIME = 264.593 NACHM 0.0 PT = 748.499 TT = 2951.9

	P	T	M	GAMMA	MULTI	SONY	NACHM	VEL	S	A/A	AJAC	WUPIN	O	IVAL	PHI	ETAC
COMBUSTOR	0	38	31	7												
58.633	10.449	3348	613.0	(1166)	1.2778	22.458	3077									
58.633	0.000	1710	-0.3	(554)	1.3375	22.461	2250	2.474	5567	2.481	0.26587	27.460	0.3771	5352	24.558	194.2 0.80 0.30
COMBUSTOR	0	39	32	7												
60.643	47.412	4889	605.7	(1748)	1.1693	24.093	3435									
60.643	19.925	4322	277.9	(1514)	1.1935	24.315	3248	1.247	4050	2.624	0.29375	27.460	0.3650	5319	18.488	193.7 0.60 0.87
COMBUSTOR	0	40	33	5												
62.263	52.942	4524	600.3	(1608)	1.1999	23.695	3375									
62.263	15.794	3658	189.4	(1260)	1.2423	23.813	3080	1.472	4535	2.603	0.30171	27.460	0.3553	5308	21.264	193.3 0.80 0.70
COMBUSTOR	0	41	34	5												
64.727	45.138	4936	590.4	(1765)	1.1641	24.186	3437									
64.727	21.099	4455	298.4	(1566)	1.1827	24.412	3276	1.167	3823	2.626	0.28599	27.460	0.3749	5288	16.989	192.6 0.80 0.91
COMBUSTOR	0	42	35	4												
65.103	41.573	4995	588.7	(1788)	1.1580	24.257	3443									
65.103	21.267	4588	326.9	(1616)	1.1712	24.489	3303	1.096	3620	2.633	0.26587	27.460	0.4032	5286	14.956	192.5 0.80 0.95
COMBUSTOR	0	43	36	4												
65.103	41.573	5047	632.8	(1810)	1.1555	24.200	3461									
65.103	22.925	4692	395.9	(1661)	1.1655	24.423	3336	1.032	3443	2.642	0.26587	27.460	0.4032	5306	14.226	193.2 0.80 0.95
NOZZLE	AE	44	37	5												
87.339	41.573	4995	588.7	(1765)	1.1580	24.257	3443									
87.339	1.312	2806	-501.2	( 915)	1.2670	24.780	2671	2.765	7385	2.633	0.05535	27.460	1.9371	6954	6.352	253.2 0.80 0.95
NOZZLE	PO	45	38	5												
87.339	41.573	4995	588.7	(1765)	1.1580	24.257	3443									
87.339	0.389	2152	-741.7	( 676)	1.2919	24.782	2362	3.455	8159	2.633	0.02367	27.460	4.5299	7415	3.001	270.0 0.80 0.95
NOZZLE	AE	46	39	5												
87.339	41.573	5047	632.8	(1810)	1.1555	24.200	3461									
87.339	1.339	2884	-471.3	( 944)	1.2638	24.779	2704	2.749	7434	2.642	0.05535	27.460	1.9371	7009	6.394	255.2 0.80 0.95
NOZZLE	PO	47	40	5												
87.339	41.573	5047	632.8	(1810)	1.1555	24.200	3461									
87.339	0.389	2206	-722.5	( 695)	1.2897	24.782	2389	3.447	8235	2.642	0.02331	27.460	4.6000	7488	2.983	272.7 0.80 0.95
FICTIVE COMBUSTOR	67	60	0													
65.103	289.462	5276	588.7	(1897)	1.1719	24.576	3537									
65.103	0.389	1419	-1060.3	( 425)	1.3270	24.985	1936	4.693	9084	2.474	0.04030	27.460	2.6604	8018	5.684	292.0 0.80 1.00
FICTIVE NOZZLE	68	61	0													
87.339	23.908	4906	564.0	(1752)	1.1537	24.222	3409									
87.339	1.709	3280	-314.0	(1095)	1.2443	24.768	2862	2.316	6828	2.673	0.05535	27.460	1.9371	6505	5.701	236.9 0.80 0.95

READING = 0.060 PLUCK = 176 II-E = 204.593 MAGN = 0.0 PI = 7.06499 TI = 2091.0

XAPS	P-1M	P-DE	POA	QVA	W-TH	W-DE	LA-ALL	P-1M/P-80	P-1M/P-10	P-DE/P-10	P-DE/P-10
6.981E-01	1.070E 00	0.000	-4.399E-01	0.000	0.000	0.000	2.470E-02	2.749E 00	1.430E-03	0.000	0.000
1.836E 01	1.070E 00	0.000	-3.562E 01	0.000	0.000	0.000	1.639E 02	2.749E 00	1.430E-03	0.000	0.000
3.070E 00	2.249E 00	0.000	-1.700E 02	0.000	0.000	0.000	5.053E 02	5.767E 00	2.949E-03	0.000	0.000
3.508E 01	3.921E 00	0.000	-3.700E 02	0.000	0.000	0.000	6.809E 02	1.009E 01	5.249E-03	0.000	0.000
3.524E 01	3.965E 00	5.778E 00	-4.000E 02	0.000	0.000	0.000	6.875E 02	1.019E 01	5.298E-03	1.684E 01	7.719E-03
3.555E 01	3.967E 00	5.742E 00	-4.001E 02	0.000	0.000	0.000	6.875E 02	1.019E 01	5.300E-03	1.475E 01	7.671E-03
3.591E 01	3.983E 00	1.750E 00	-4.641E 02	-3.544E 02	-3.848E 02	0.000	7.551E 02	1.033E 01	5.321E-03	4.495E 00	2.338E-03
3.604E 01	3.960E 00	2.374E 00	-4.726E 02	-3.360E 02	-3.800E 02	0.000	7.703E 02	1.017E 01	5.301E-03	6.099E 00	3.172E-03
3.648E 01	4.237E 00	4.154E 00	-4.935E 02	-3.975E 02	-3.975E 02	0.000	8.137E 02	1.088E 01	5.660E-03	1.067E 01	5.550E-03
3.701E 01	4.255E 00	6.400E 00	-5.187E 02	-4.218E 02	-4.100E 02	-1.188E 01	8.692E 02	1.033E 01	5.855E-03	1.644E 01	8.551E-03
3.737E 01	4.249E 00	7.437E 00	-5.325E 02	-4.354E 02	-4.189E 02	-1.656E 01	9.087E 02	1.030E 01	5.670E-03	2.039E 01	1.068E-02
3.803E 01	4.225E 00	1.282E 01	-5.503E 02	-4.606E 02	-4.358E 02	-2.483E 01	9.803E 02	1.085E 01	5.645E-03	3.293E 01	1.713E-02
3.839E 01	6.149E 00	1.551E 01	-5.523E 02	-4.752E 02	-4.459E 02	-2.934E 01	1.021E 03	1.579E 01	8.133E-03	3.985E 01	2.072E-02
3.875E 01	6.042E 00	1.548E 01	-5.561E 02	-4.904E 02	-4.566E 02	-3.375E 01	1.061E 03	2.046E 01	1.074E-02	3.977E 01	2.069E-02
3.886E 01	6.639E 00	1.547E 01	-5.569E 02	-4.953E 02	-4.602E 02	-3.514E 01	1.074E 03	2.219E 01	1.154E-02	3.975E 01	2.067E-02
3.901E 01	9.420E 00	1.557E 01	-5.580E 02	-5.019E 02	-4.650E 02	-3.694E 01	1.091E 03	2.420E 01	1.359E-02	3.998E 01	2.080E-02
3.937E 01	1.699E 01	1.579E 01	-5.673E 02	-5.188E 02	-4.821E 02	-4.290E 01	1.149E 03	3.849E 01	2.022E-02	4.055E 01	2.109E-02
3.950E 01	1.375E 01	1.375E 01	-5.734E 02	-5.250E 02	-4.821E 02	-4.290E 01	1.149E 03	3.849E 01	2.263E-02	3.532E 01	1.837E-02
3.965E 01	1.745E 01	7.950E 00	-5.968E 02	-5.432E 02	-4.960E 02	-4.721E 01	1.190E 03	4.482E 01	2.331E-02	2.042E 01	1.062E-02
4.000E 01	1.769E 01	7.778E 00	-6.070E 02	-5.503E 02	-5.169E 02	-5.081E 01	1.208E 03	4.532E 01	2.357E-02	1.998E 01	2.107E-02
4.036E 01	2.070E 01	7.325E 00	-6.369E 02	-5.699E 02	-5.169E 02	-5.300E 01	1.240E 03	5.316E 01	2.765E-02	1.885E 01	9.786E-03
4.040E 01	2.101E 01	7.340E 00	-6.400E 02	-5.719E 02	-5.185E 02	-5.344E 01	1.253E 03	5.372E 01	2.807E-02	1.885E 01	9.806E-03
4.041E 01	2.109E 01	7.340E 00	-6.407E 02	-5.725E 02	-5.189E 02	-5.357E 01	1.259E 03	5.418E 01	2.818E-02	1.886E 01	9.811E-03
4.136E 01	2.197E 01	7.718E 00	-7.368E 02	-6.406E 02	-5.641E 02	-7.468E 01	1.369E 03	7.466E 01	3.683E-02	1.983E 01	1.031E-02
4.142E 01	2.061E 01	7.744E 00	-7.442E 02	-6.463E 02	-5.675E 02	-7.687E 01	1.374E 03	7.607E 01	3.956E-02	1.989E 01	1.035E-02
4.150E 01	3.029E 01	7.838E 00	-7.532E 02	-6.536E 02	-5.715E 02	-7.774E 01	1.383E 03	7.774E 01	4.043E-02	2.013E 01	1.047E-02
4.246E 01	1.286E 01	9.002E 00	-8.091E 02	-7.536E 02	-6.245E 02	-1.291E 02	1.496E 03	3.334E 01	1.716E-02	2.312E 01	1.203E-02
4.414E 01	1.683E 01	1.104E 01	-8.297E 02	-7.9561E 02	-6.7193E 02	-1.369E 02	1.701E 03	4.352E 01	2.248E-02	2.637E 01	1.475E-02
4.431E 01	1.722E 01	1.274E 01	-8.328E 02	-7.9774E 02	-6.7245E 02	-1.728E 03	1.728E 03	4.424E 01	2.301E-02	3.272E 01	1.702E-02
4.601E 01	1.837E 01	1.770E 01	-8.361E 02	-1.046E 03	-7.551E 02	-2.912E 02	1.782E 03	4.720E 01	2.555E-02	4.548E 01	2.365E-02
4.686E 01	1.903E 01	1.629E 01	-8.358E 02	-1.055E 03	-7.582E 02	-2.969E 02	1.789E 03	4.897E 01	2.542E-02	4.698E 01	2.443E-02
4.625E 01	3.487E 01	3.240E 01	-7.978E 02	-1.291E 03	-8.327E 02	-4.583E 02	1.961E 03	8.919E 01	4.639E-02	8.322E 01	4.328E-02
4.625E 01	3.487E 01	3.250E 01	-7.973E 02	-1.293E 03	-8.332E 02	-4.596E 02	1.961E 03	8.919E 01	4.654E-02	8.322E 01	4.342E-02
4.731E 01	4.667E 01	4.314E 01	-7.162E 02	-1.407E 03	-8.685E 02	-5.990E 02	2.091E 03	1.194E 02	6.235E-02	1.108E 02	5.763E-02
4.738E 01	4.731E 01	4.387E 01	-7.105E 02	-1.501E 03	-8.923E 02	-6.087E 02	2.108E 03	1.215E 02	6.230E-02	1.127E 02	5.862E-02
4.811E 01	5.370E 01	3.741E 01	-6.292E 02	-1.633E 03	-9.302E 02	-7.028E 02	2.191E 03	1.339E 02	7.174E-02	9.609E 01	4.998E-02
4.882E 01	3.107E 01	3.107E 01	-5.183E 02	-1.757E 03	-9.670E 02	-7.897E 02	2.280E 03	7.982E 01	4.151E-02	7.982E 01	4.151E-02
4.863E 01	3.098E 01	3.098E 01	-5.167E 02	-1.758E 03	-9.675E 02	-7.909E 02	2.281E 03	7.959E 01	4.139E-02	7.959E 01	4.139E-02
4.936E 01	2.627E 01	2.627E 01	-4.376E 02	-1.847E 03	-9.948E 02	-8.521E 02	2.348E 03	6.748E 01	3.510E-02	6.748E 01	3.510E-02
5.077E 01	3.751E 01	3.751E 01	-2.018E 02	-2.007E 03	-1.066E 03	-1.010E 03	2.525E 03	9.636E 01	5.012E-02	9.636E 01	5.012E-02
5.267E 01	2.550E 01	2.550E 01	1.451E 02	-2.343E 03	-1.171E 03	-1.222E 03	2.792E 03	6.530E 01	3.407E-02	6.530E 01	3.407E-02
5.337E 01	2.352E 01	2.352E 01	2.088E 02	-2.462E 03	-1.195E 03	-1.267E 03	2.855E 03	6.041E 01	3.142E-02	6.041E 01	3.142E-02
5.412E 01	2.147E 01	2.147E 01	2.958E 02	-2.565E 03	-1.232E 03	-1.333E 03	2.951E 03	5.514E 01	2.868E-02	5.514E 01	2.868E-02
5.488E 01	1.939E 01	1.939E 01	3.750E 02	-2.605E 03	-1.269E 03	-1.397E 03	3.048E 03	4.980E 01	2.590E-02	4.980E 01	2.590E-02
5.576E 01	1.789E 01	1.789E 01	4.571E 02	-2.777E 03	-1.310E 03	-1.466E 03	3.161E 03	4.568E 01	2.390E-02	4.568E 01	2.390E-02
5.631E 01	1.496E 01	1.496E 01	5.644E 02	-2.841E 03	-1.334E 03	-1.507E 03	3.209E 03	4.556E 01	2.264E-02	4.556E 01	2.264E-02
5.636E 01	9.300E 00	1.686E 01	6.616E 02	-2.8647E 03	-1.336E 03	-1.511E 03	3.216E 03	2.359E 01	1.242E-02	4.332E 01	2.253E-02
5.650E 01	1.649E 01	1.649E 01	6.725E 02	-2.863E 03	-1.341E 03	-1.522E 03	3.236E 03	2.359E 01	1.242E-02	4.332E 01	2.253E-02
5.658E 01	1.601E 01	1.601E 01	6.791E 02	-2.871E 03	-1.344E 03	-1.527E 03	3.244E 03	2.359E 01	1.242E-02	4.332E 01	2.253E-02
5.709E 01	1.468E 01	1.468E 01	7.035E 02	-2.902E 03	-1.354E 03	-1.547E 03	3.280E 03	4.113E 01	2.139E-02	4.113E 01	2.139E-02
5.741E 01	1.042E 01	1.042E 01	7.153E 02	-2.926E 03	-1.363E 03	-1.563E 03	3.305E 03	3.712E 01	1.962E-02	3.712E 01	1.962E-02
5.883E 01	6.000E 00	6.000E 00	7.493E 02	-3.002E 03	-1.389E 03	-1.613E 03	3.407E 03	2.678E 01	1.393E-02	2.678E 01	1.393E-02
5.884E 01	1.952E 01	1.952E 01	7.463E 02	-3.106E 03	-1.426E 03	-1.640E 03	3.542E 03	1.541E 01	8.014E-03	1.541E 01	8.014E-03
6.084E 01	1.992E 01	1.992E 01	7.714E 02	-3.306E 03	-1.498E 03	-1.680E 03	3.749E 03	5.116E 01	2.662E-02	5.116E 01	2.662E-02
6.226E 01	1.579E 01	1.579E 01	7.714E 02	-3.544E 03	-1.554E 03	-1.695E 03	3.972E 03	4.057E 01	2.110E-02	4.057E 01	2.110E-02



XAB8	P-1H	P-0H	P-04	004	0-1R	0-0B	CALL	P-1C/1-50	P-1H/1-10	P-0B/1-50	P-0B/1-10
6.473E 01	2.110E 01	2.110E 01	7.714E 02	-5.725E 03	-1.677E 03	-2.049E 03	4.289E 03	5.420E 01	2.419E-02	5.420E 01	2.419E-02
6.510E 01	2.062E 01	2.191E 01	7.714E 02	-5.712E 03	-1.648E 03	-2.074E 03	4.337E 03	5.298E 01	2.754E-02	5.628E 01	2.927E-02
6.514E 01	2.062E 01	2.194E 01	7.714E 02	-5.717E 03	-1.700E 03	-2.076E 03	4.342E 03	5.298E 01	2.756E-02	5.650E 01	2.938E-02
6.534E 01	1.967E 01	2.242E 01	7.714E 02	-5.601E 03	-1.712E 03	-2.059E 03	4.349E 03	5.255E 01	2.624E-02	5.760E 01	2.946E-02
6.700E 01	1.175E 01	4.290E 00	9.472E 02	-5.908E 03	-1.790E 03	-2.117E 03	4.583E 03	3.018E 01	1.570E-02	2.386E 01	1.241E-02
6.707E 01	1.107E 00	8.865E 00	1.141E 03	-4.017E 03	-1.613E 03	-2.204E 03	4.685E 03	2.860E 01	1.123E-02	2.277E 01	1.184E-02
6.844E 01	4.265E 00	6.255E 00	1.338E 03	-4.070E 03	-1.835E 03	-2.235E 03	4.760E 03	1.173E 01	6.049E-03	1.761E 01	9.158E-03
6.916E 01	3.547E 03	4.975E 00	1.465E 03	-4.117E 03	-1.851E 03	-2.266E 03	4.848E 03	9.112E 00	4.739E-03	1.278E 01	6.647E-03
6.977E 01	2.885E 00	4.203E 00	1.548E 03	-4.155E 03	-1.862E 03	-2.293E 03	4.922E 03	8.697E 00	3.567E-03	1.080E 01	5.615E-03
7.072E 01	1.935E 00	3.000E 00	1.640E 03	-4.207E 03	-1.876E 03	-2.31E 03	5.036E 03	4.970E 00	2.585E-03	7.706E 00	4.008E-03
7.115E 01	1.595E 00	2.766E 00	1.672E 03	-4.226E 03	-1.881E 03	-2.346E 03	5.108E 03	4.97E 00	2.131E-03	7.106E 00	3.696E-03
7.266E 01	1.935E 00	1.935E 00	1.757E 03	-4.263E 03	-1.897E 03	-2.366E 03	5.273E 03	2.752E 00	1.431E-03	4.971E 00	2.585E-03
7.283E 01	1.020E 00	1.998E 00	1.763E 03	-4.280E 03	-1.897E 03	-2.386E 03	5.290E 03	2.620E 00	1.363E-03	4.363E 00	2.269E-03
7.359E 01	1.108E 00	5.150E-01	1.800E 03	-4.311E 03	-1.905E 03	-2.406E 03	5.374E 03	2.847E 00	1.461E-03	1.323E 00	6.860E-04
7.359E 01	1.104E 00	5.087E-01	1.801E 03	-4.311E 03	-1.905E 03	-2.406E 03	5.375E 03	2.848E 00	1.461E-03	1.307E 00	6.796E-04
7.491E 01	1.265E 00	0.000	1.826E 03	-4.357E 03	-1.917E 03	-2.440E 03	5.426E 03	3.249E 00	1.640E-03	0.000	0.000
7.776E 01	2.165E 00	0.000	1.844E 03	-4.377E 03	-1.937E 03	-2.440E 03	5.525E 03	3.249E 00	1.640E-03	0.000	0.000
8.106E 01	1.485E 00	0.000	1.972E 03	-4.348E 03	-1.958E 03	-2.440E 03	5.630E 03	3.615E 00	1.984E-03	0.000	0.000
8.447E 01	1.170E 00	0.000	2.002E 03	-4.418E 03	-1.977E 03	-2.440E 03	5.684E 03	3.005E 00	1.563E-03	0.000	0.000
8.733E 01	1.750E 00	0.000	2.037E 03	-4.451E 03	-2.011E 03	-2.440E 03	5.707E 03	4.495E 00	2.338E-03	0.000	0.000
6.734E 01	1.751E 00	0.000	2.037E 03	-4.451E 03	-2.011E 03	-2.440E 03	5.707E 03	4.496E 00	2.340E-03	0.000	0.000

READING ROOM CLOCK = 176 TIME = 204.543

X	CONAS	CURAG	CF	MC
4.040E-01	1.177E-02	1.177E-02	2.215E-03	4.301E-02
4.041E-01	1.766E-01	1.176E-02	2.216E-03	4.301E-02
4.136E-01	1.482E-01	1.347E-02	2.336E-03	4.700E-02
4.142E-01	1.163E-00	1.358E-02	2.349E-03	4.749E-02
4.150E-01	1.389E-00	1.372E-02	2.355E-03	4.752E-02
4.246E-01	1.713E-01	1.543E-02	2.416E-03	4.808E-02
4.414E-01	2.946E-01	1.838E-02	2.446E-03	4.759E-02
4.431E-01	2.865E-00	1.667E-02	2.447E-03	4.762E-02
4.480E-01	8.388E-00	1.950E-02	2.445E-03	4.742E-02
4.486E-01	9.838E-01	1.960E-02	2.443E-03	4.735E-02
4.625E-01	2.434E-01	2.204E-02	3.082E-03	5.654E-02
4.626E-01	1.678E-01	2.205E-02	2.767E-03	5.241E-02
4.731E-01	1.513E-01	2.357E-02	2.839E-03	6.930E-02
4.738E-01	9.771E-01	2.366E-02	3.019E-03	6.487E-02
4.811E-01	9.523E-00	2.462E-02	3.012E-03	6.339E-02
4.882E-01	9.993E-00	2.562E-02	3.389E-03	4.903E-02
4.936E-01	1.617E-01	2.563E-02	2.804E-03	6.024E-02
5.077E-01	1.526E-01	2.630E-02	2.746E-03	5.522E-02
5.077E-01	1.526E-01	2.783E-02	2.796E-03	6.000E-02
5.237E-01	1.965E-01	2.979E-02	2.884E-03	4.720E-02
5.237E-01	1.965E-01	3.029E-02	3.031E-03	4.247E-02
5.412E-01	7.498E-00	3.104E-02	3.011E-03	4.012E-02
5.488E-01	7.444E-00	3.178E-02	3.007E-03	3.745E-02
5.576E-01	8.366E-00	3.262E-02	2.993E-03	3.540E-02
5.631E-01	3.145E-00	3.294E-02	2.972E-03	3.190E-02
5.636E-01	4.371E-01	3.298E-02	3.148E-03	2.614E-02
5.650E-01	1.153E-00	3.309E-02	2.979E-03	2.729E-02
5.658E-01	6.617E-01	3.316E-02	3.353E-03	2.797E-02
5.666E-01	2.297E-00	3.339E-02	3.139E-03	2.924E-02
5.709E-01	1.830E-00	3.357E-02	3.115E-03	2.807E-02
5.781E-01	6.128E-00	3.419E-02	3.023E-03	2.342E-02
5.832E-01	8.901E-00	3.508E-02	2.769E-03	1.711E-02
6.054E-01	1.502E-01	3.658E-02	2.643E-03	3.848E-02
6.226E-01	1.062E-01	3.764E-02	3.223E-03	2.820E-02
6.273E-01	1.926E-01	3.957E-02	3.148E-03	3.233E-02
6.510E-01	2.507E-00	3.982E-02	3.358E-03	2.942E-02
6.514E-01	2.614E-01	3.984E-02	3.455E-03	2.989E-02
6.534E-01	1.329E-00	3.998E-02	3.453E-03	2.981E-02
6.700E-01	1.144E-01	4.112E-02	3.359E-03	2.204E-02
6.767E-01	4.303E-00	4.155E-02	3.337E-03	1.964E-02
6.844E-01	4.511E-00	4.200E-02	3.286E-03	1.505E-02
6.916E-01	3.615E-00	4.236E-02	3.246E-03	1.230E-02
6.977E-01	2.692E-00	4.263E-02	3.216E-03	1.058E-02
7.072E-01	3.605E-00	4.299E-02	3.173E-03	8.292E-03
7.115E-01	1.439E-00	4.314E-02	3.156E-03	7.566E-03
7.268E-01	4.421E-00	4.358E-02	3.103E-03	5.708E-03
7.283E-01	3.567E-01	4.361E-02	3.091E-03	5.285E-03
7.358E-01	1.453E-00	4.376E-02	3.021E-03	3.543E-03
7.359E-01	2.330E-03	4.376E-02	3.020E-03	3.533E-03
7.491E-01	8.669E-01	4.385E-02	3.070E-03	4.962E-03
7.776E-01	2.226E-00	4.407E-02	3.123E-03	7.439E-03
8.166E-01	2.071E-00	4.432E-02	3.053E-03	5.501E-03
8.447E-01	1.056E-00	4.442E-02	3.049E-03	4.611E-03
8.733E-01	4.613E-01	4.447E-02	3.047E-03	6.239E-03
8.734E-01	0.000	4.447E-02	3.047E-03	6.242E-03

ORIGINAL PAGE IS  
OF POOR QUALITY

# RAMJET PERFORMANCE

## ENGINE PERFORMANCE

CALCULATED THRUST..... 1407. (LBF)  
 MEASURED THRUST..... 1646. (LBF)  
 CALCULATED SPECIFIC IMPULSE..... 2103. (LBF=SEC/LBM)  
 MEASURED SPECIFIC IMPULSE..... 2326. (LBF=SEC/LBM)  
 CALCULATED THRUST COEFFICIENT..... 0.5941  
 MEASURED THRUST COEFFICIENT..... 0.6573  
  
 REGENERATIVE-COOLED ENGINE PERFORMANCE  
 CALCULATED  
 STREAM THRUST..... 6557. (LBF)  
 NET THRUST..... 1539. (LBF)  
 SPECIFIC IMPULSE..... 2176. (LBF=SEC/LBM)  
 THRUST COEFFICIENT..... 0.6148

## MOMENTUM AND FORCES

INLET FRICTION DRAG..... 117.7 (LBF)  
 INLET MOMENTUM CHANGE..... -757.7 (LBF)  
 COMBUSTOR FRICTION DRAG..... 280.5 (LBF)  
 COMBUSTOR STRUT DRAG..... 1.65 (LBF)  
 COMBUSTOR MOMENTUM CHANGE..... 1026. (LBF)  
 NOZZLE FRICTION DRAG..... 46.51 (LBF)  
 NOZZLE STRUT DRAG..... 0.00 (LBF)  
 NOZZLE MOMENTUM CHANGE..... 1219. (LBF)  
 NOZZLE PRESSURE INTEGRAL..... 1266. (LBF)  
 EXTERNAL FRICTION DRAG..... 56.73 (LBF)  
 EXTERNAL PRESSURE INTEGRAL..... -1236. (LBF)  
 TOTAL EXTERNAL DRAG..... -1292. (LBF)  
 TOTAL STRUT DRAG..... 1.65 (LBF)  
 CAVITY FORCE..... -1225. (LBF)  
 CALCULATED LOAD CELL FORCE..... -1030. (LBF)  
 MEASURED LOAD CELL FORCE..... -872. (LBF)  
 FUEL VACUUM SPECIFIC IMPULSE -171.4; -126.6;

## STATIONS

NOMINAL CONE LEADING EDGE..... 34.884 (IN)  
 SPIKE TRANSLATION..... 0.362 (IN)  
 INLET THROAT..... 40.400 (IN)  
 CONE LEADING EDGE..... 35.247 (IN)  
 NOZZLE SHROUD TRAILING EDGE..... 73.507 (IN)  
 NOZZLE PLUG TRAILING EDGE..... 87.334 (IN)  
 STRUT LEADING EDGE..... 56.503 (IN)  
 STRUT TRAILING EDGE..... 65.103 (IN)  
 COMBUSTOR TAIL..... 65.103 (IN)

## INLET

ANGLE OF ATTACK..... 0.000 (DEGREES)  
 MASS FLOW RATE..... 0.000  
 ADDITIVE DRAG COEFFICIENT..... 0.0007  
 LIFTING PRESSURE RECOVERY EFFICIENCY..... 0.1621 (PSI)  
 DELTA P12..... 0.1186  
 TOTAL PRESSURE RECOVERY - SUPERSONIC..... 0.3867  
 TOTAL PRESSURE RECOVERY - SUBSONIC..... 0.1644  
 INLET PROCESS EFFICIENCY - SUPERSONIC..... 0.8966  
 INLET PROCESS EFFICIENCY - SUBSONIC..... 0.9060  
 KINETIC ENERGY EFFICIENCY - SUPERSONIC..... 0.9314  
 KINETIC ENERGY EFFICIENCY - SUBSONIC..... 0.8823  
 ENTHALPY AT P0 - SUPERSONIC..... -4.99 (BTU/LBM)  
 ENTHALPY AT P0 - SUBSONIC..... 29.29 (BTU/LBM)

## COMBUSTOR

FUEL-AIR RATIO..... 0.0264  
 EQUIVALENCE RATIO..... 0.795  
 COMBUSTOR EFFICIENCY..... 0.949  
 TOTAL PRESSURE RATIO..... 0.1436  
 COMBUSTOR EFFECTIVENESS..... 0.8396  
 INJECTOR DISCHARGE COEFFICIENTS 0.7801; 0.6678;

## NOZZLE

VACUUM STREAM THRUST COEFFICIENT - C8..... 0.9353  
 NOZZLE COEFFICIENT - C7..... 0.8512  
 PROCESS EFFICIENCY..... 0.8397  
 KINETIC ENERGY EFFICIENCY..... 0.8535

## FUEL INJECTORS

INJECTORS	STATION	VALVE
1A	40.400	
1B	41.348	
1C	44.300	
2A	48.823	C
2C	46.250	E
3A	54.113	
3B	56.298	
4	44.846	